

## GENERAL NOTES FOR STRUCTURAL CONSTRUCTION

### 1. STRUCTURAL DESIGN NOTES

- a. Design Code: BNBC 2020,
- b. Wind Speed: 80 m/s
- c. Seismic Zone: 3, DUAL system: IMF (special reinforced shear walls)
- d. Live Load: BNBC 2020
- e. Structural detailing shall follow BNBC 2020 special detailing unless otherwise shown.
- f. All structural drawings shall be read in conjunction with relevant architectural drawings.

### 2. GENERAL INSTRUCTIONS

- a. Please do not scale from the drawings.
- b. All dimensions on these drawings shall be checked on site before the work commences. Figured dimensions shall be taken in preference to scaled dimensions. Project engineer, site engineer, contractors and sub-contractors shall notify the consultant/owner about any discrepancies/differences observed in the drawings before commencing the work.
- c. Project engineer, site engineer, contractors and sub-contractors are to verify the following at site:  
i) Reinforcement position, ii) Development length, iii) Clear cover, iv) Concrete mix ratio, v) Levels.

### 3. MATERIALS

- a. Coarse aggregate:  
Crushed natural stone chips with maximum size of 20mm. All coarse aggregate must be well graded, i.e. shall have all particle sizes between 5mm and 20mm in appropriate proportion. If necessary, coarse aggregates of different maximum sizes may be mixed to attain good grading. All coarse aggregates must be free from dust and particles of size less than 5mm. Aggregate grading shall meet the requirements of ASTM C33/C33M-13 specification. Los Angeles Abrasion value shall not exceed 30% (for Grading B).  
TESTS: i) Sieve analysis, ASTM C136-14 ii) L.A. Abrasion Test ASTM C131-14.

- b. Fine aggregate:  
i) Sylhet sand of F.M.>2.4 shall be used for all structural components e.g. mat, column, lift core, shear wall, basement wall, beam, slab, stair, water tank etc.  
ii) Local sand of F.M.>1.4 shall be used for non-structural components e.g. plastering, floor finish etc.  
iii) Local sand of F.M.>0.8 shall be used for earth filling works.  
Aggregate grading shall meet the requirements of ASTM C33/C33M-13 specification.  
TESTS: i) Sieve analysis, ASTM C136-14

- c. Cement:  
As per standards BDS EN 197-1:2003, Type CEM-II/A-M  
TESTS: i) Setting time and soundness by EN 196-3, ii) Strength by EN 196-1, iii) Fineness by EN 196-6.

### d. Steel Reinforcement:

Minimum yield strength  $f_y = 420 \text{ MPa}$  (60000 ksi) for all structural elements. The ratio of ultimate strength ( $f_u$ ) to actual yield strength ( $f_y$ ) shall not be less than 1.25.

TESTS: i) Unit weight, yield strength, ultimate strength and elongation by ISO-6892-1-2009, ii) Bend test by ISO-7438-2005, iii) Deformation measurement.

### e. Water:

Clean water free from impurities (e.g. salinity, hardness, chlorine/chloride, sulphate) shall be used for concreting. Amount of water shall be in accordance with concrete mix design.

### 4. CONCRETE

- a. Minimum & required 28-day cylinder compressive strength of any test cylinder shall be as follows,

	Mimum ( $f'_c$ )	Required ( $f_{cr}$ )
Pile	3000 psi (21 MPa)	4200 psi (29 MPa)
Pile cap	3500 psi (25 MPa)	4700 psi (32.5MPa)
Column	3500 psi (25 MPa)	4700 psi (32.5MPa)
Shear wall	3500 psi (25 MPa)	4700 psi (32.5MPa)
Beam	3500 psi (25 MPa)	4700 psi (32.5MPa)
Slab	3500 psi (25 MPa)	4700 psi (32.5MPa)
Stair	3500 psi (25 MPa)	4700 psi (32.5MPa)
Overhead water tank	3500 psi (25 MPa)	4700 psi (32.5MPa)
Others	3000 psi (25 MPa)	4200 psi (29 MPa)

- b. Concrete mix proportion shall be determined based on appropriate mix design to achieve the required target strength ( $f'_{cr}$ ) following the guideline of BNBC 2020 section 5.6.2, Part 6.

- c. To achieve workability, superplasticizer RHEOBUILD 1100 (BASF) or equivalent may be used. The dose and procedure of adding superplasticizer shall be as per the manufacturer's specifications.

- d. Curing of concrete:  
Minimum curing time shall be 28 days. Method of curing shall be: i) Slabs: ponding, ii) Columns/walls: wrapping hessian and wetting it periodically, iii) Beams: periodically spraying water from underside.

### 5. MINIMUM LAP LENGTH FOR REINFORCING BARS

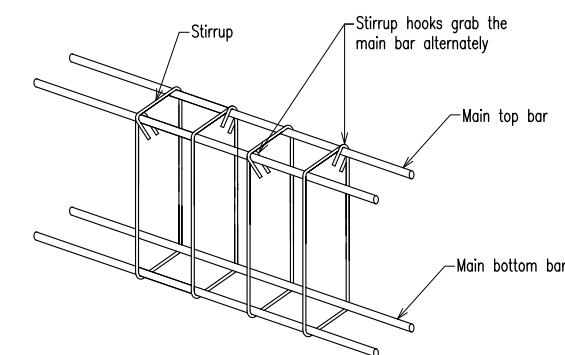
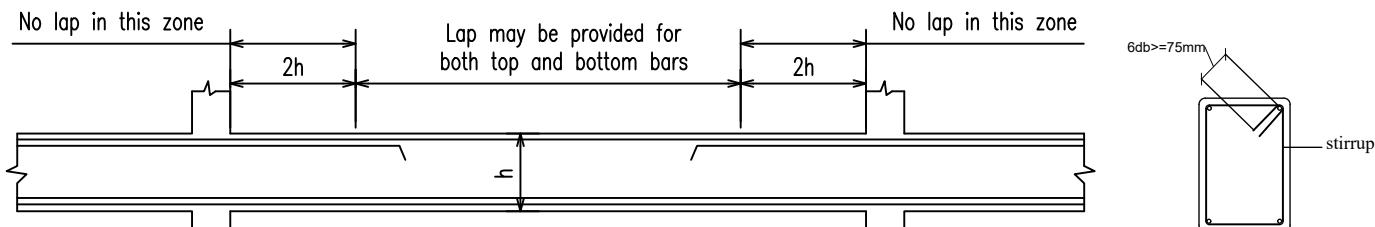
BAR DIA (mm)	TENSION (mm)	COMPRESSION (mm)
8Ø	330	305
10Ø	410	305
12Ø	525	370
16Ø	660	490
20Ø	1000	610
25Ø	1300	770

PROJECT - ENGENIUS		SHEET TITTLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER						
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			GENERAL NOTE 1 OF 3	01	ENGENIUS	BRIDGE BUILDERS						
DRWING TITLE	GENERAL NOTE 1 OF 3						02	20-12-24	01	01-12-24	REV DATE	DESCRIPTION

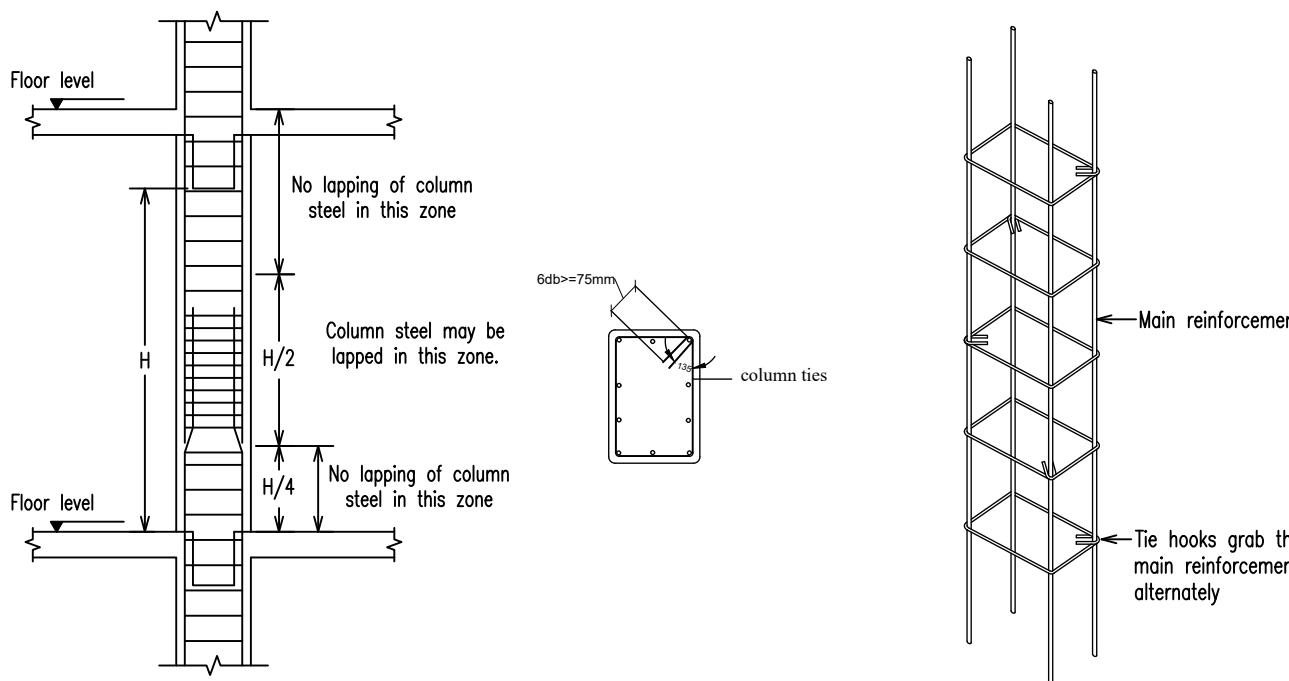
A B C D E F G H I J K L

6. LAP SPLICING LOCATION IN BEAMS AND STIRRUP HOOK LENGTH:

Not more than 50% of the bars shall be spliced at one place of the beam. Lap splices are to be confined by hoops/stirrups with maximum spacing of 125mm.



7. LAP SPLICING LOCATION IN COLUMNS:



Lap splices are to be confined by hoops/ties with maximum spacing of column's tie least spacing .

8. DEVELOPMENT LENGTH FOR ALL CONDITION

BAR DIA (mm)	Ld(mm)
8Ø	330
10Ø	410
12Ø	525
16Ø	660
20Ø	1000
25Ø	1300

9. CONCRETE CLEAR COVER FOR REINFORCING BARS

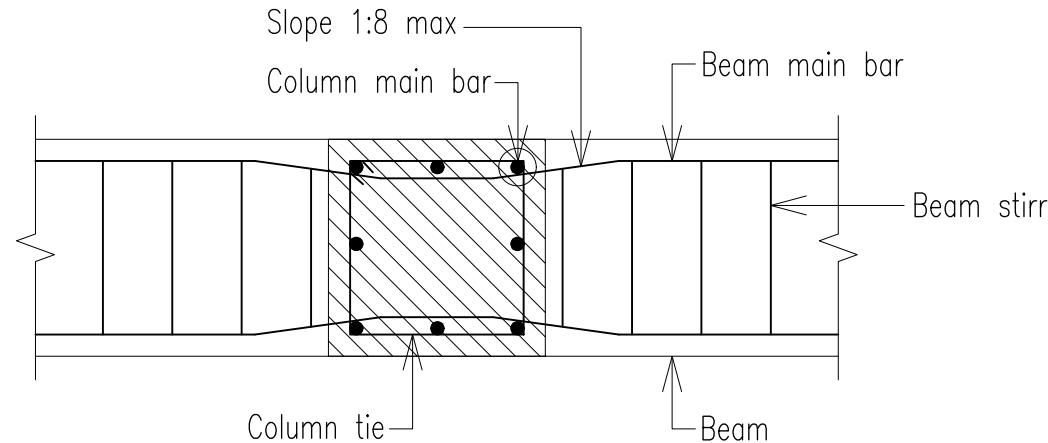
Member	Location or Condition	Thickness of Cover	Figure
Pile cap/base slab	side	75	
	bottom	75	
column	above ground level & not in earth contact	* 40	
	below ground level in earth contact	* 80	
beam	floor beam top, side & bottom	** 40	
	Grade beam	** 80	
slab and stair	Top	20	
	Bottom	25	
wall (above 250mm except basement)	exterior	40	
	interior	40	
water tank	water face	50	
	other face	50	

PROJECT - ENGENIUS		SHEET TITTLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			GENERAL NOTE 2 OF 3	02	ENGENIUS	BRIDGE BUILDERS			
DRWING TITLE	GENERAL NOTE 2 OF 3	02 20-12-24					01 01-12-24	REV DATE DESCRIPTION	

# GENERAL NOTES FOR STRUCTURAL CONSTRUCTION

## 10. AVOIDING CONFLICT BETWEEN BEAM AND COLUMN REINFORCEMENT

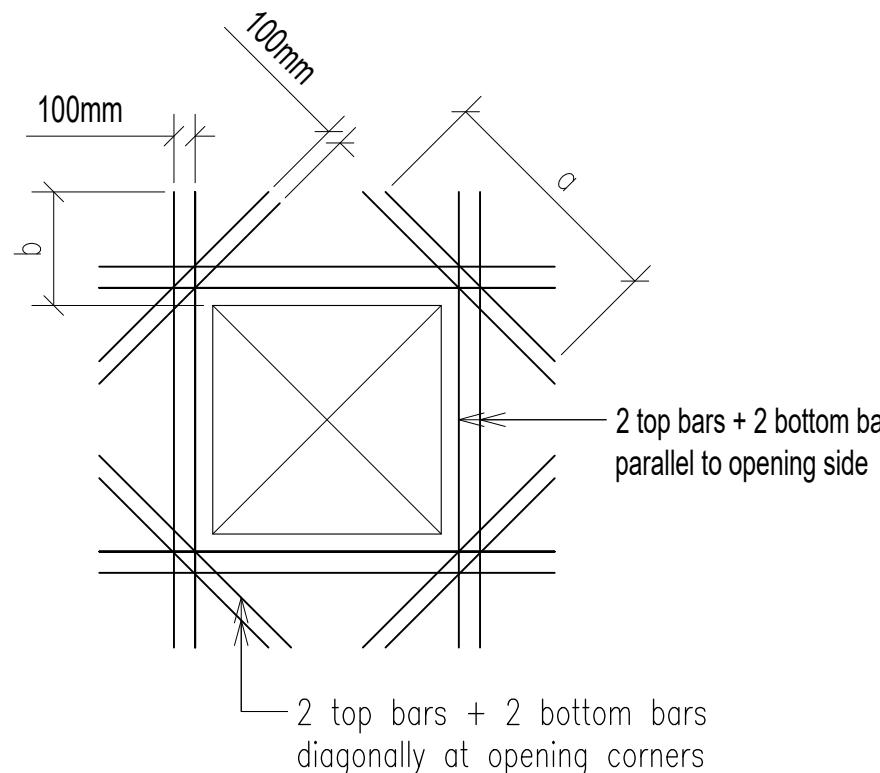
If conflict arises between beam and column or wall reinforcement when beam steel enters or passes through column, the beam reinforcement may be horizontally bent inwards into the column as shown in the following figure.



PLAN SECTION OF BEAM COLUMN JOINT

## 11. REINFORCEMENT DETAILING AROUND VOID/OPENING

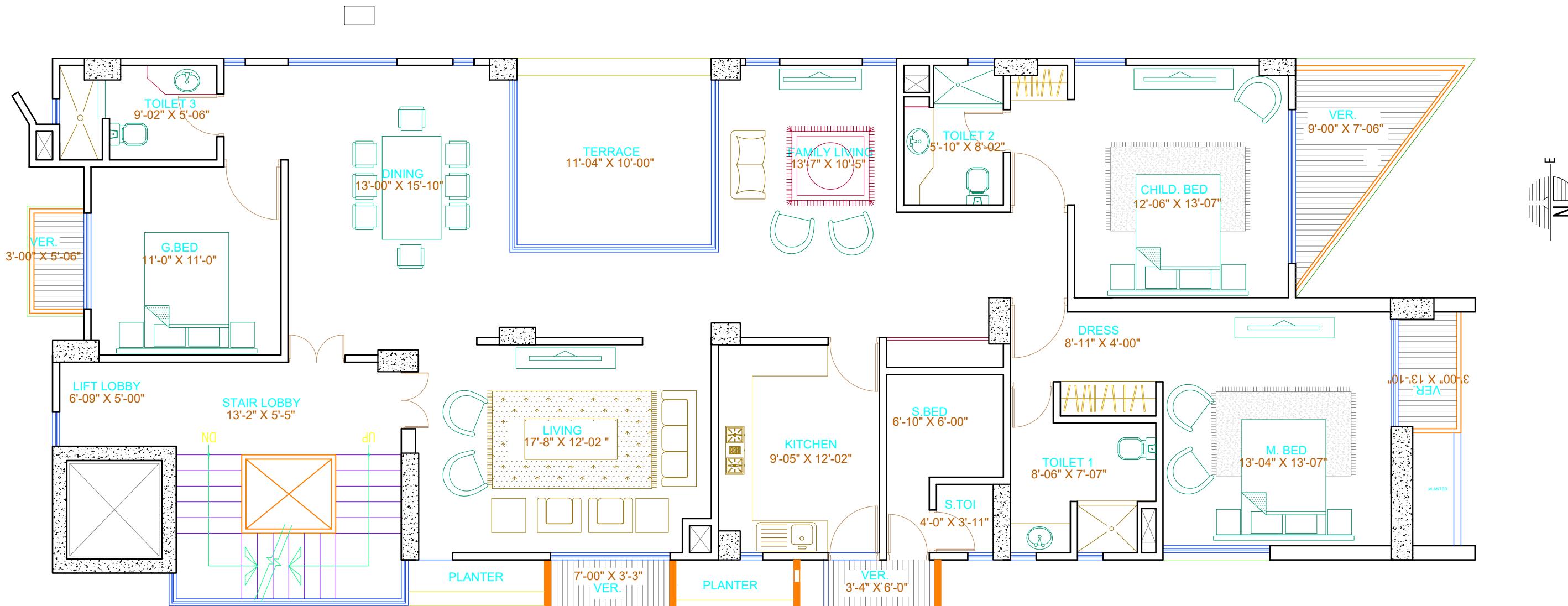
Reinforcement details around void/opening shall be as shown in figure below. The detailing is valid for maximum void size of 36"x36". For void/opening of larger size contact the consultant.



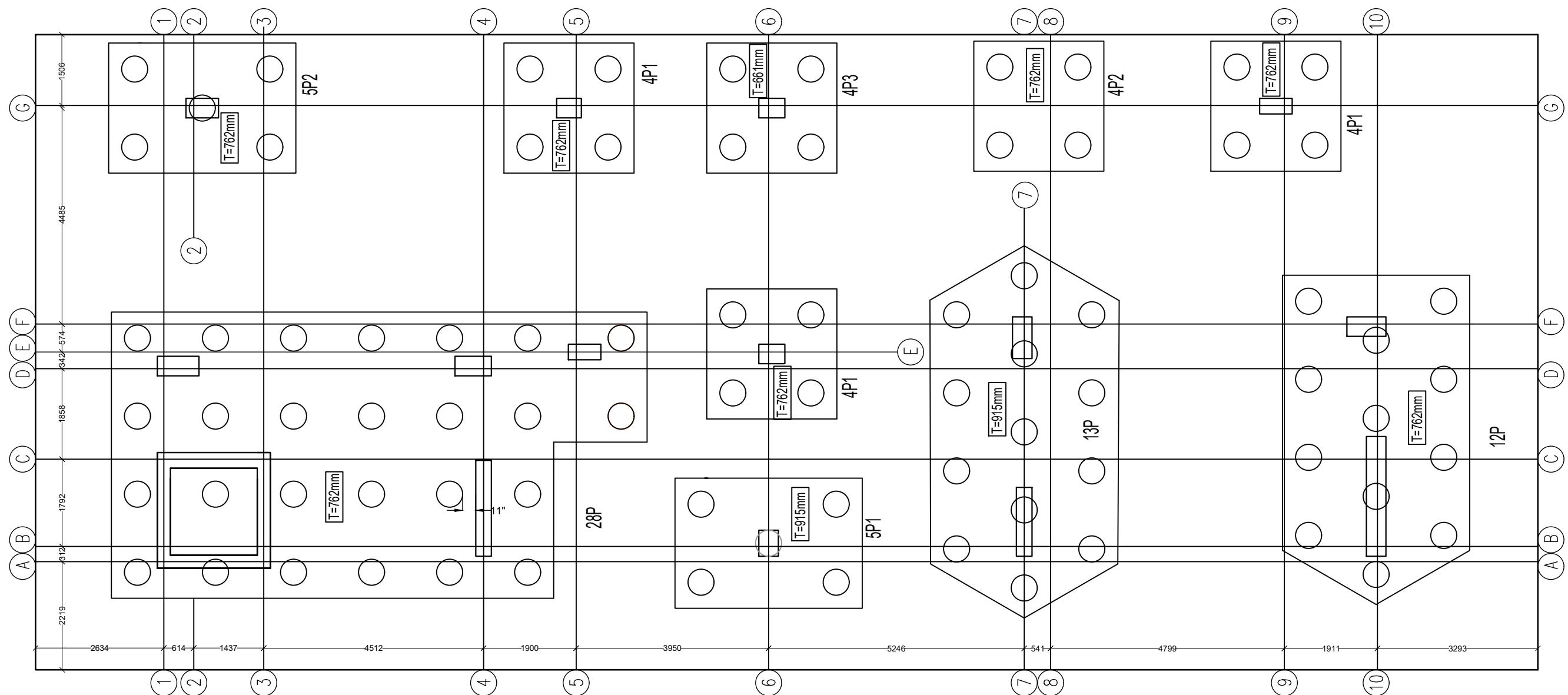
	Void/opening size less than 18"	Void/opening size between 18" ~ 36"
Dim. a	915mm	1530mm
Dim. b	610mm	915mm
Bar size	Ø16	Ø20

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GENERAL NOTE 3 OF 3		03	ENGENIUS		BRIDGE BUILDERS		
DRWING TITLE	GENERAL NOTE 3 OF 3						REV	DATE	DESCRIPTION

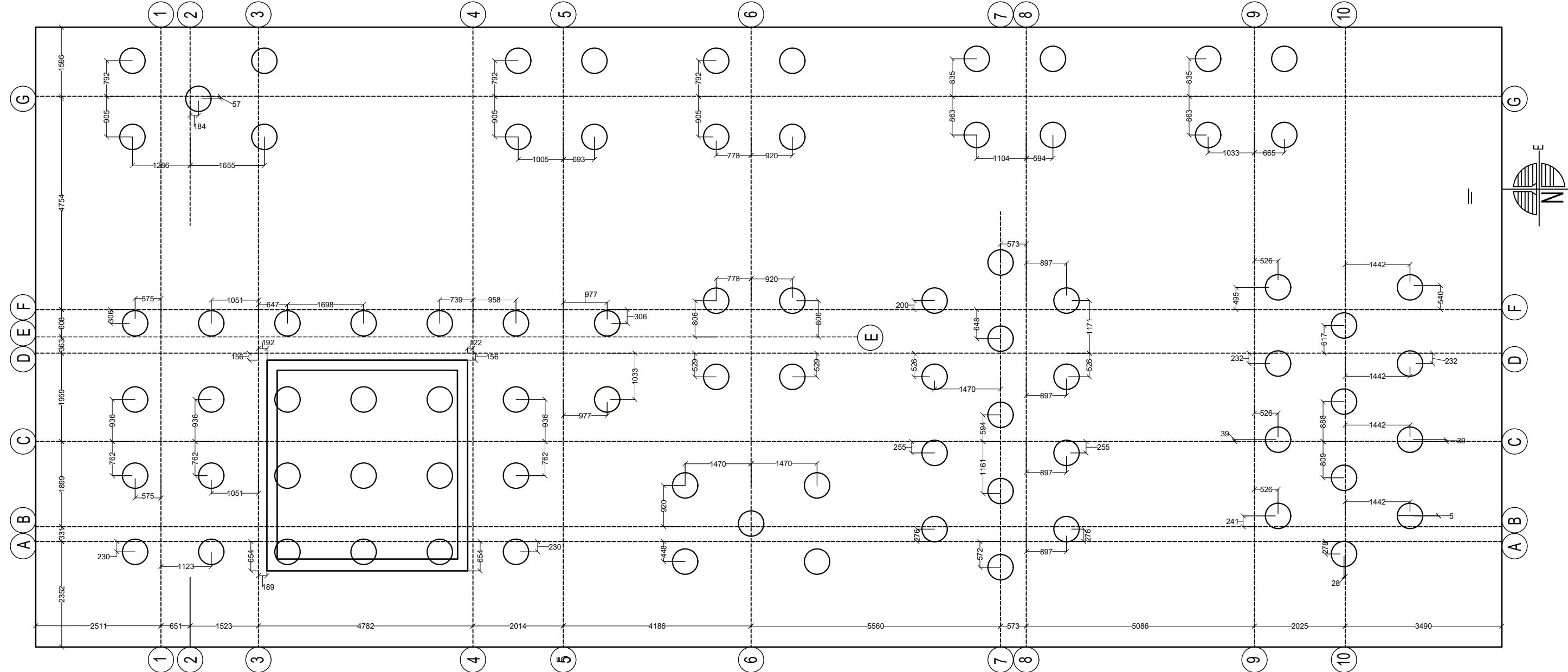
02 20-12-24  
01 01-12-24  
REV DATE DESCRIPTION

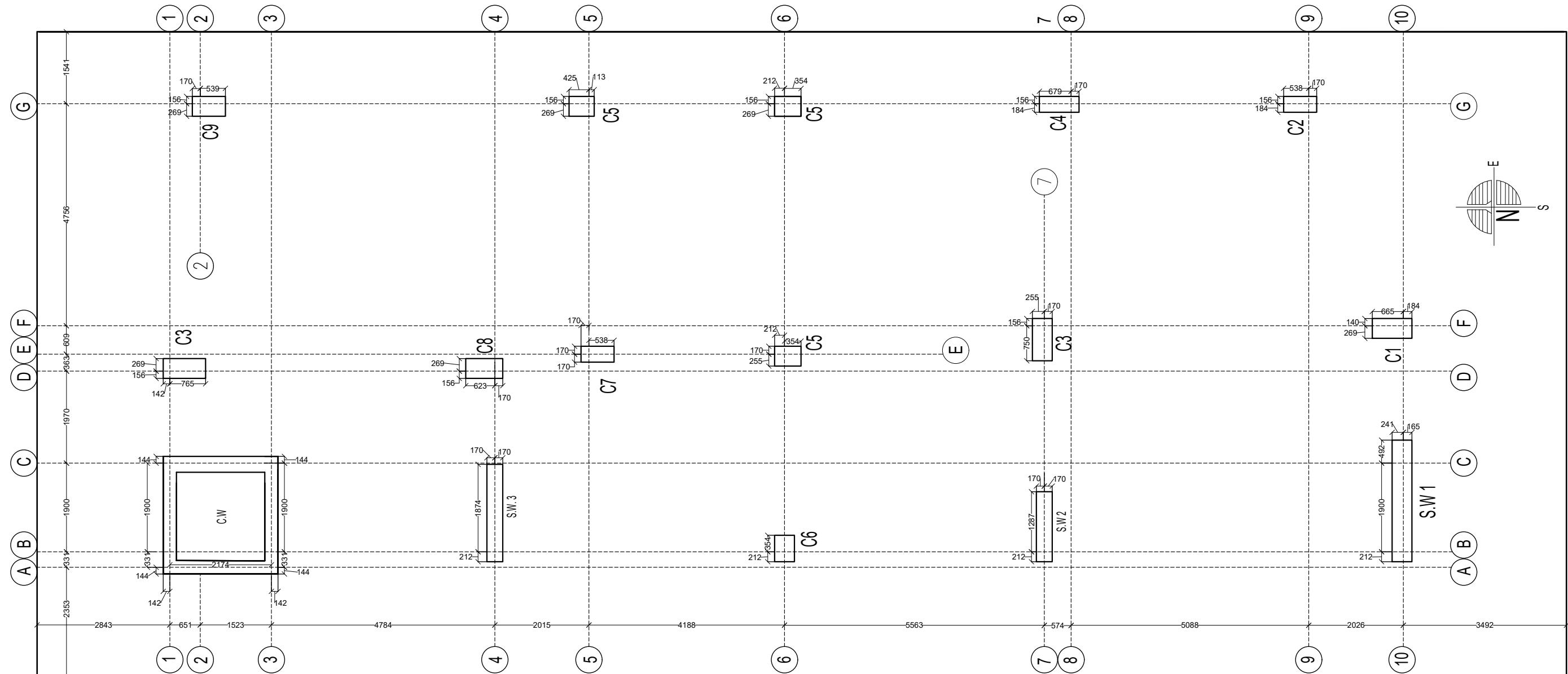


08	PROJECT -ENGENIUS		SHEET TITTLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER								
	PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		COLUMN POSITION	04		ENGENIUS	BRIDGE BUILDERS								
	DRWING TITLE	COLUMN POSITION						02	20-12-24	01	01-12-24	REV	DATE	DESCRIPTION	
	A	B	C	D	E	F	G	H	I	J	K	L			

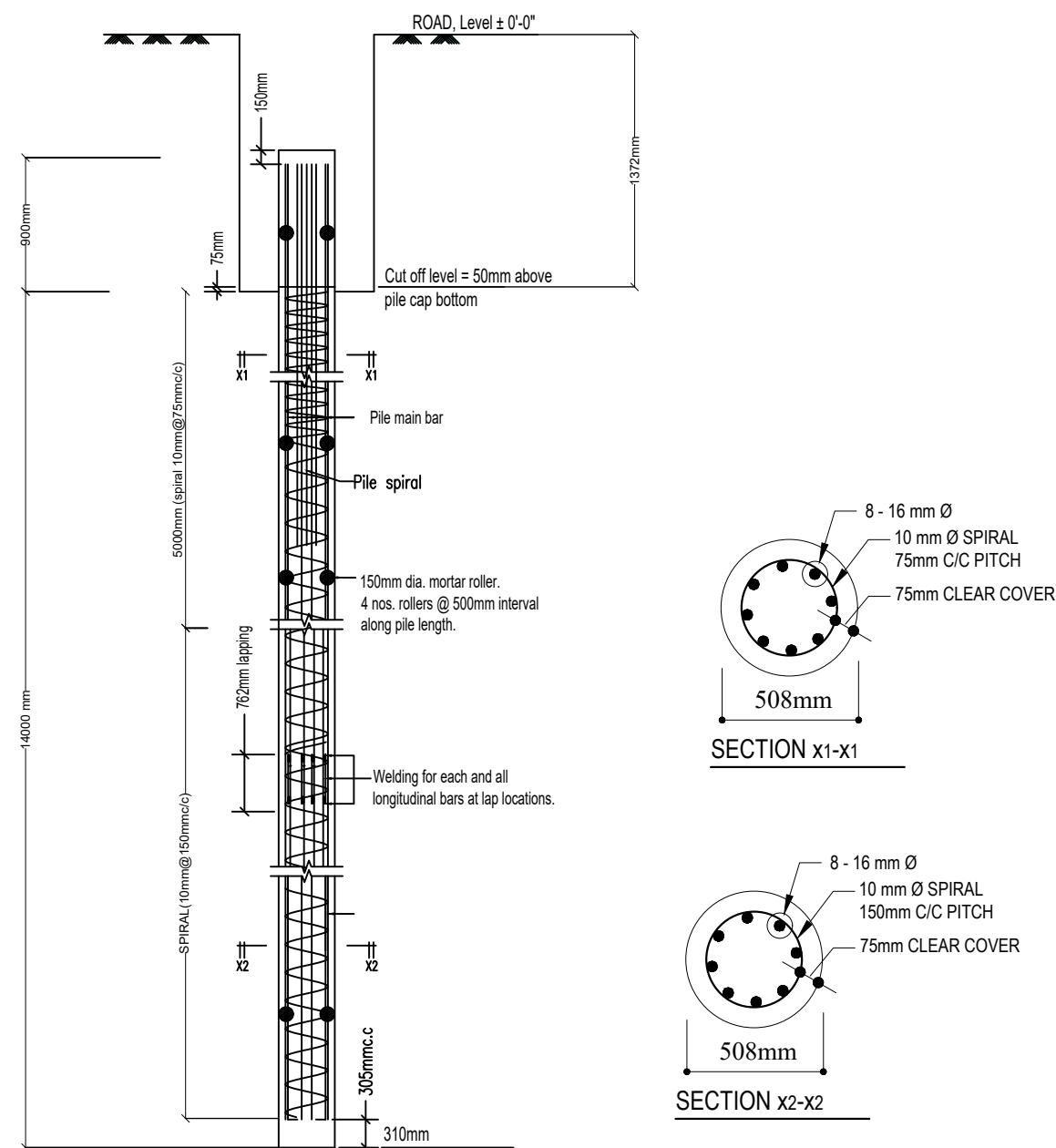


PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		PILE CAP LAYOUT	06		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	PILE CAP LAYOUT							
A	B	C	D	E	F	G	H	I

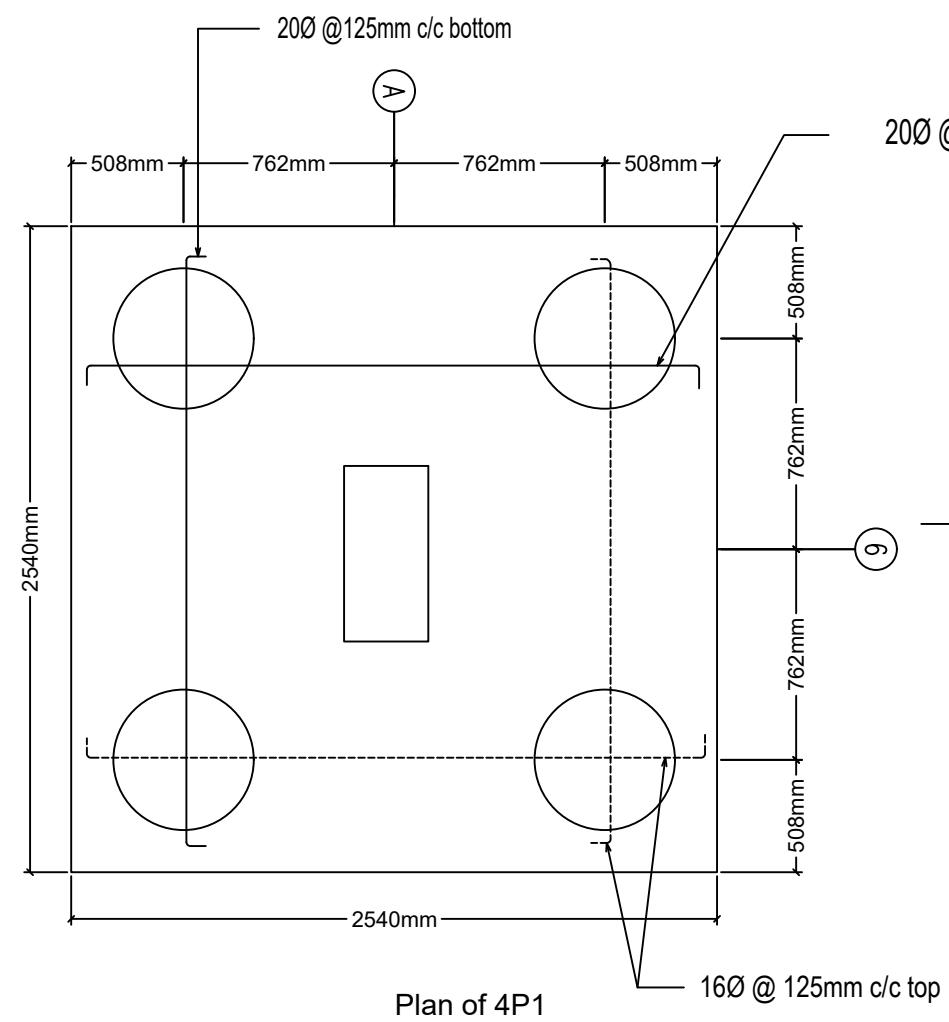




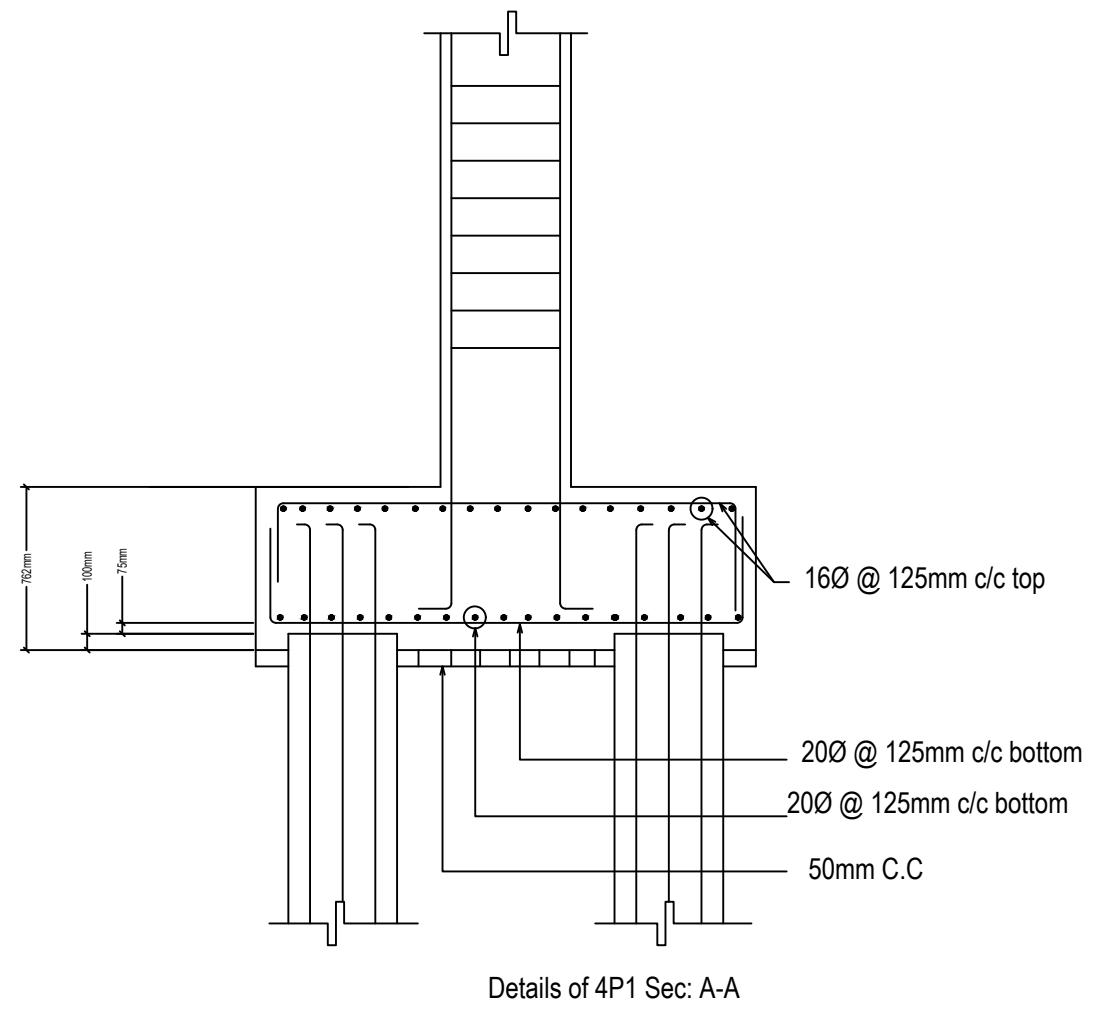
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	DRWING TITLE	COLUMN LAYOUT							02 20-12-24			
									01 01-12-24			
								REV	DATE	DESCRIPTION		
	A	B	C	D	E	F	G	H	I	J	K	L



PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		LONG SECTION OF PILE	07		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	LONG SECTION OF PILE						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

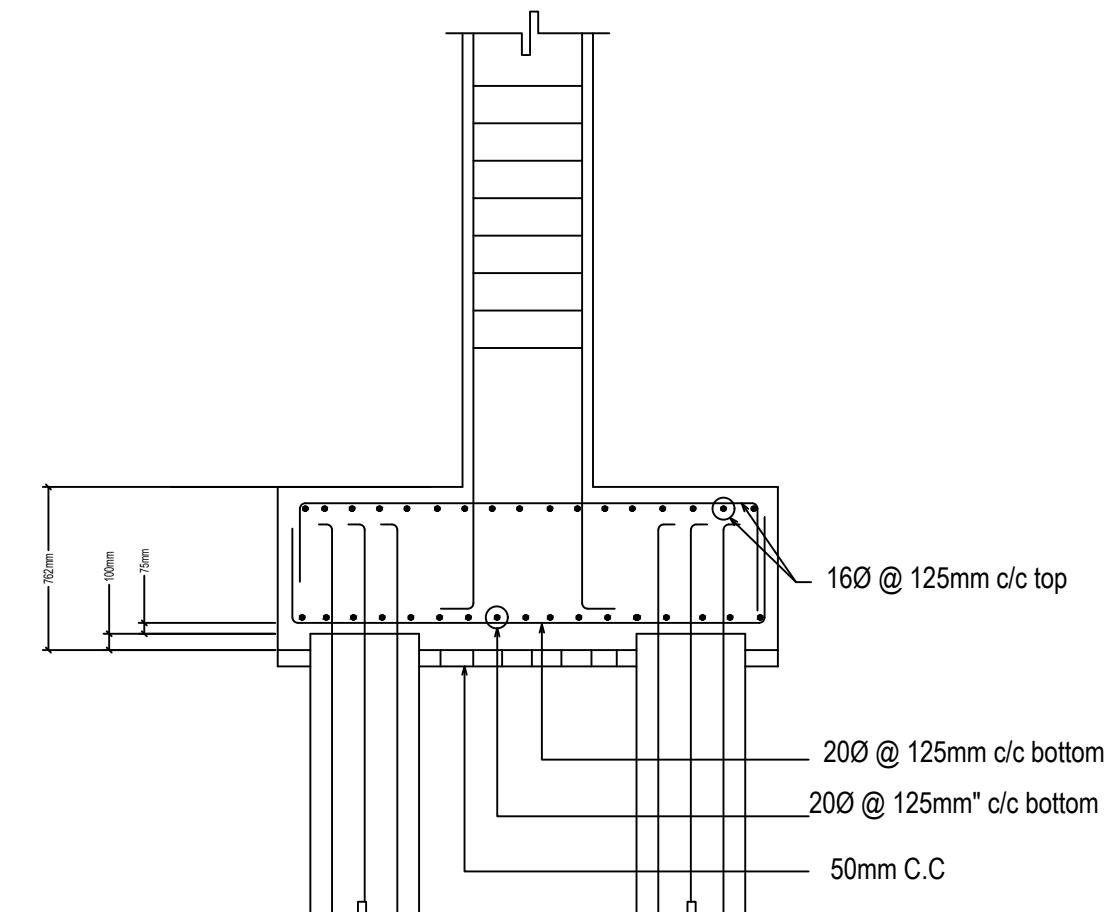
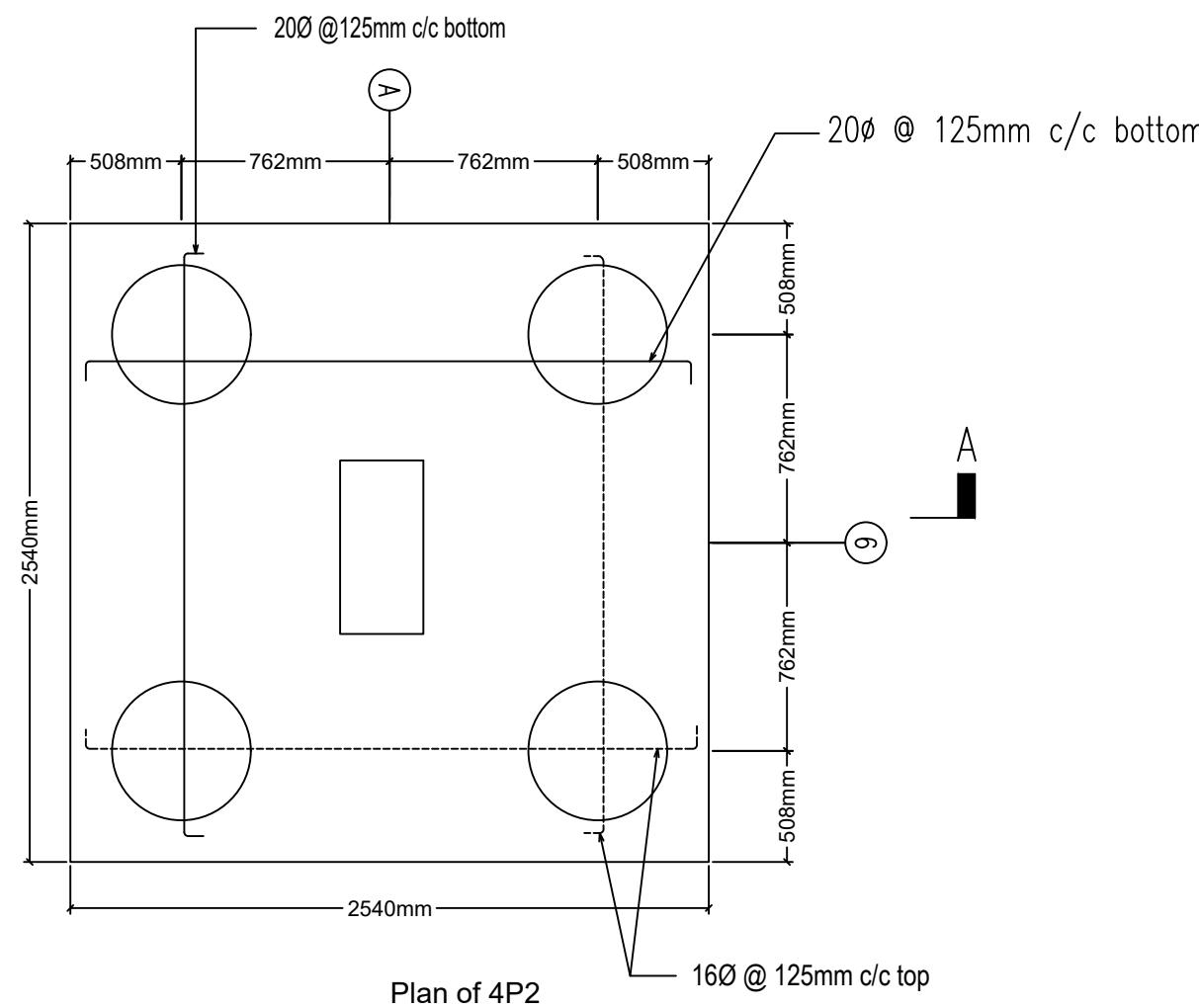


20Ø @ 125mm c/c bottom



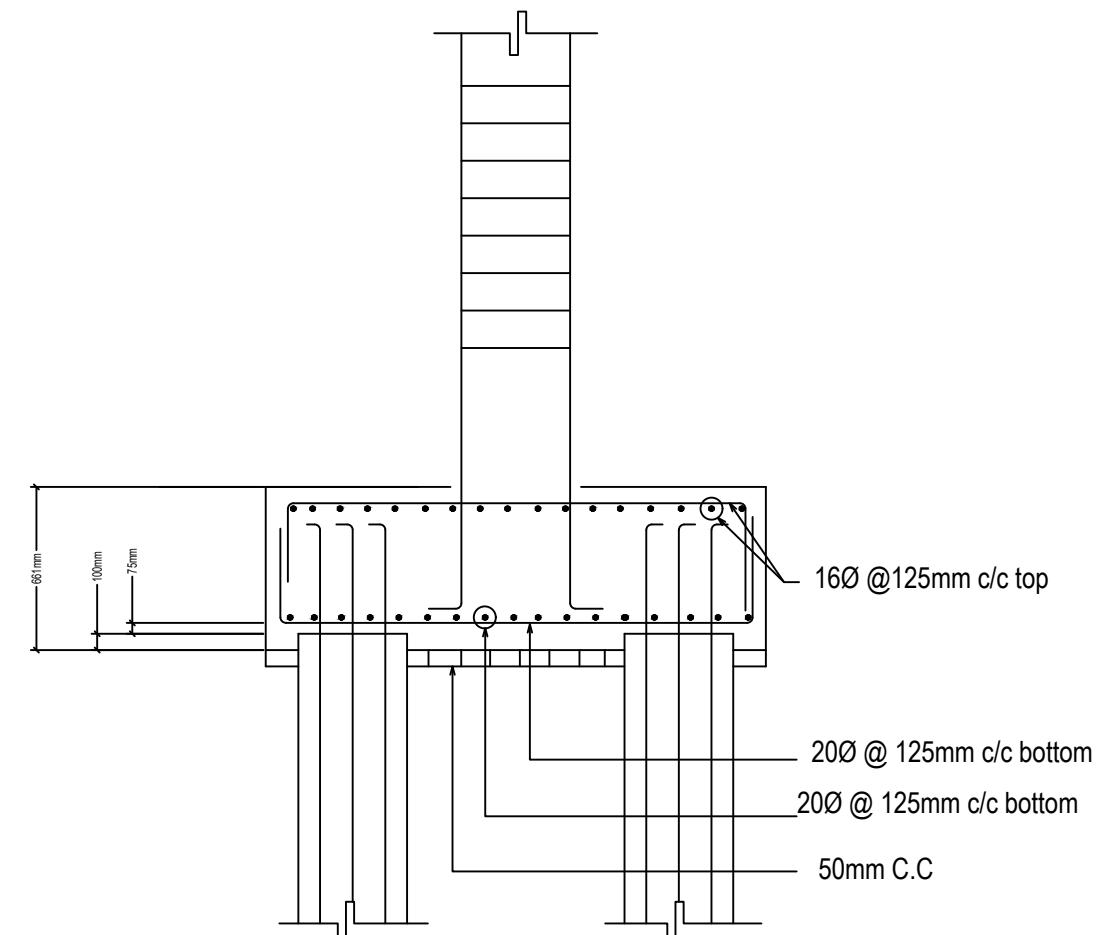
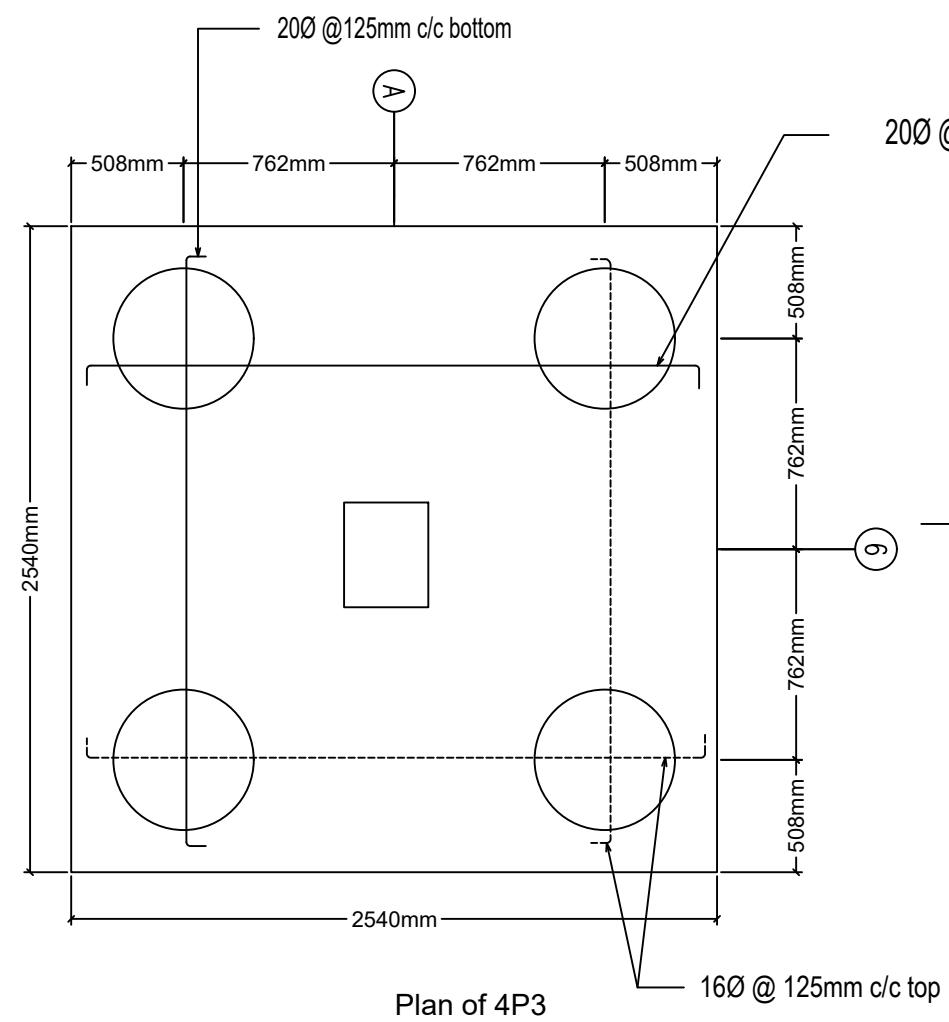
Pile Cap 4P1

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		PILE CAP 4P1	08		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	PILE CAP DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



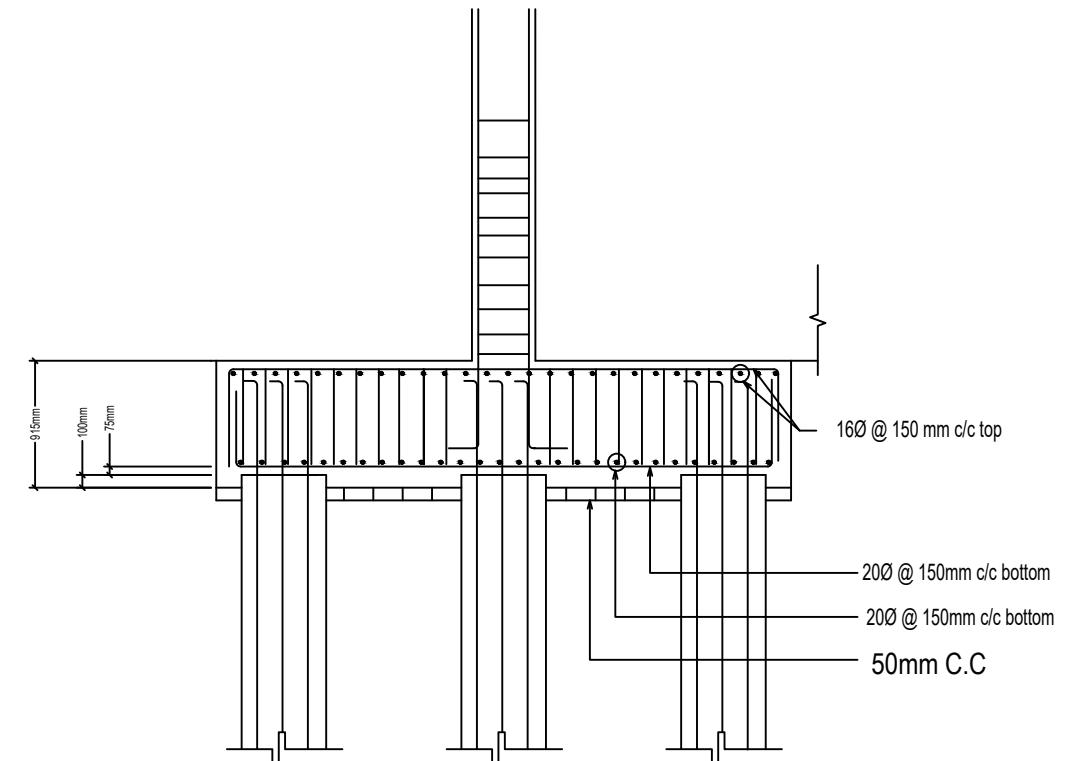
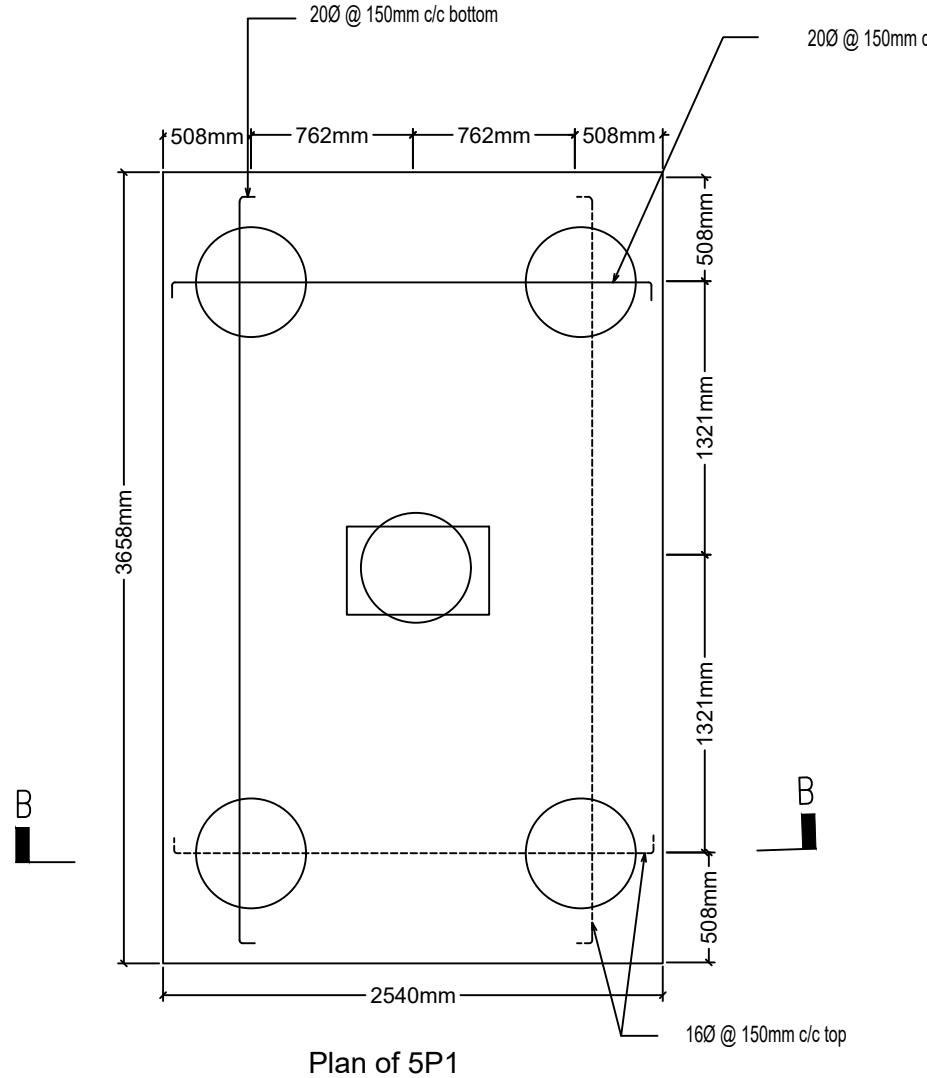
Pile Cap 4P2

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		PILE CAP 4P2	09		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	PILE CAP DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



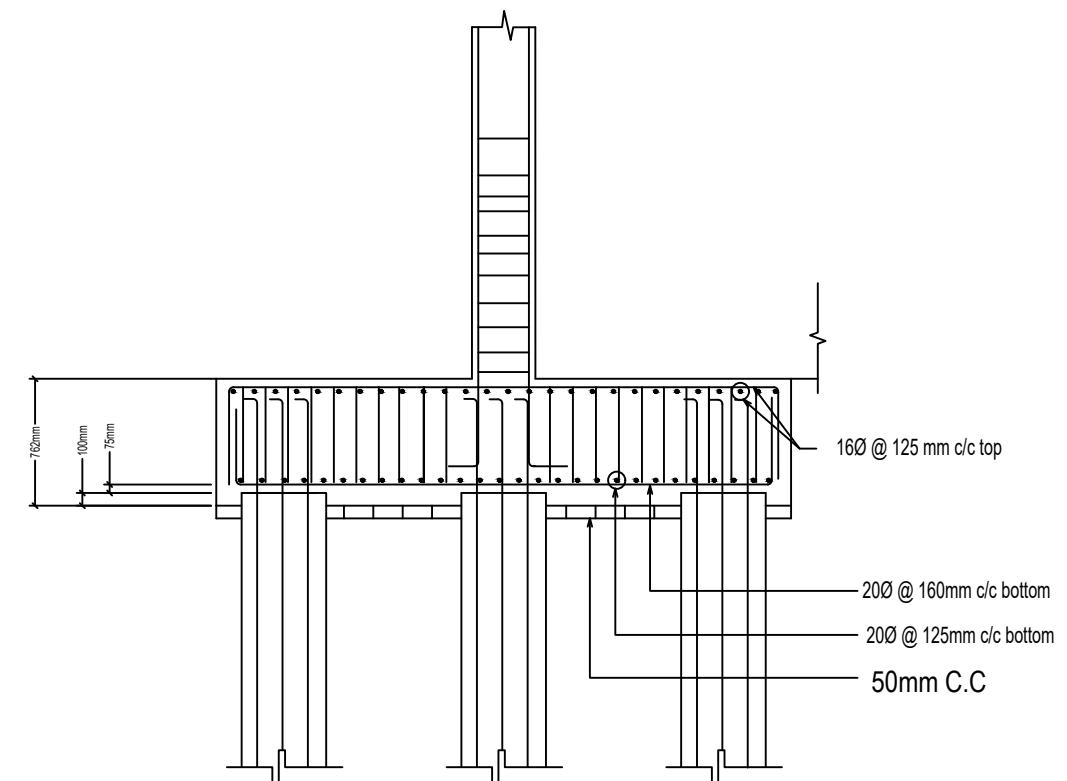
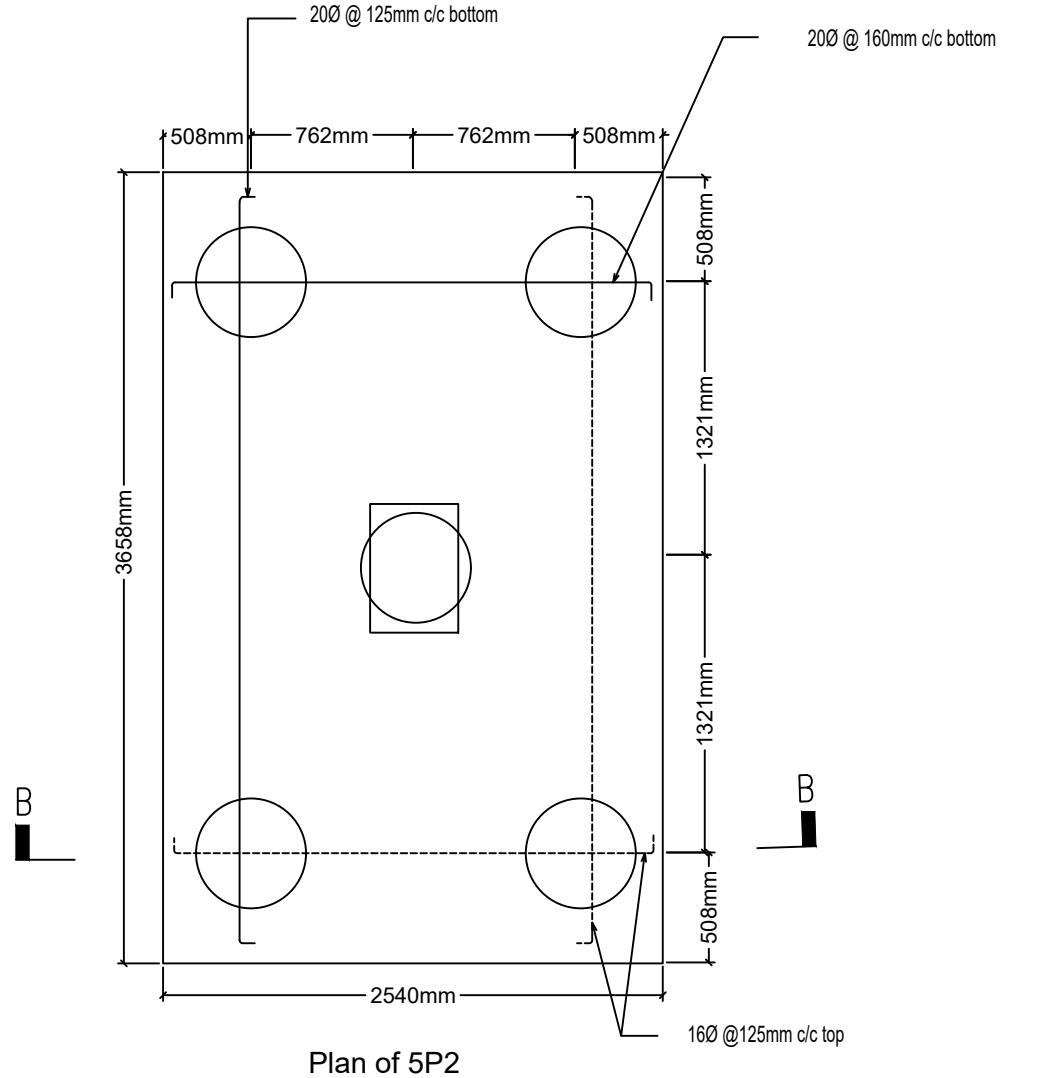
Pile Cap 4P3

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		PILE CAP 4P3	10		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	PILE CAP DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



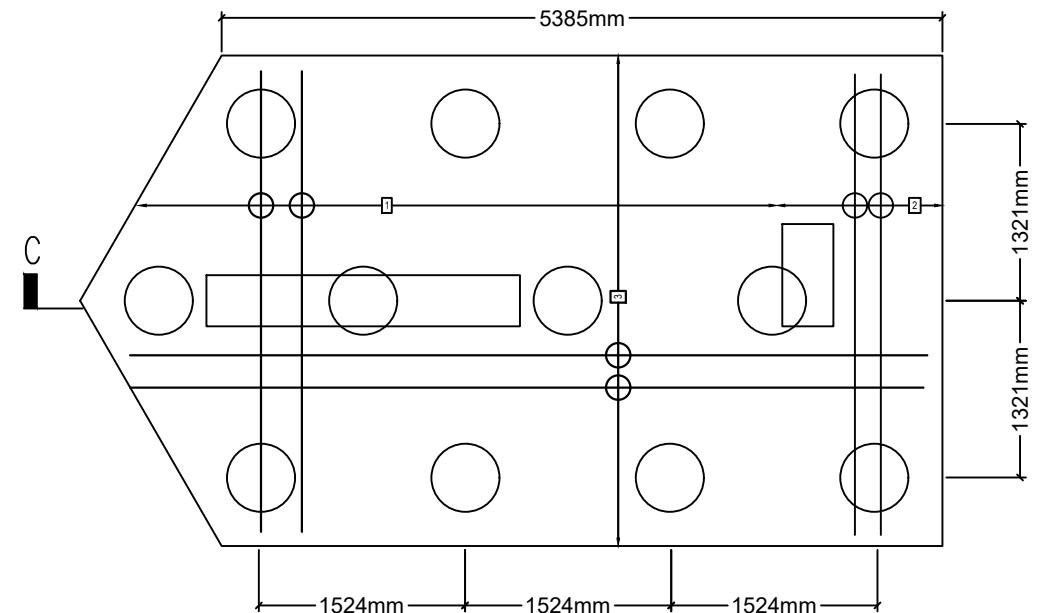
Pile Cap 5P1

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		PILE CAP 5P1	11		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	PILE CAP DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

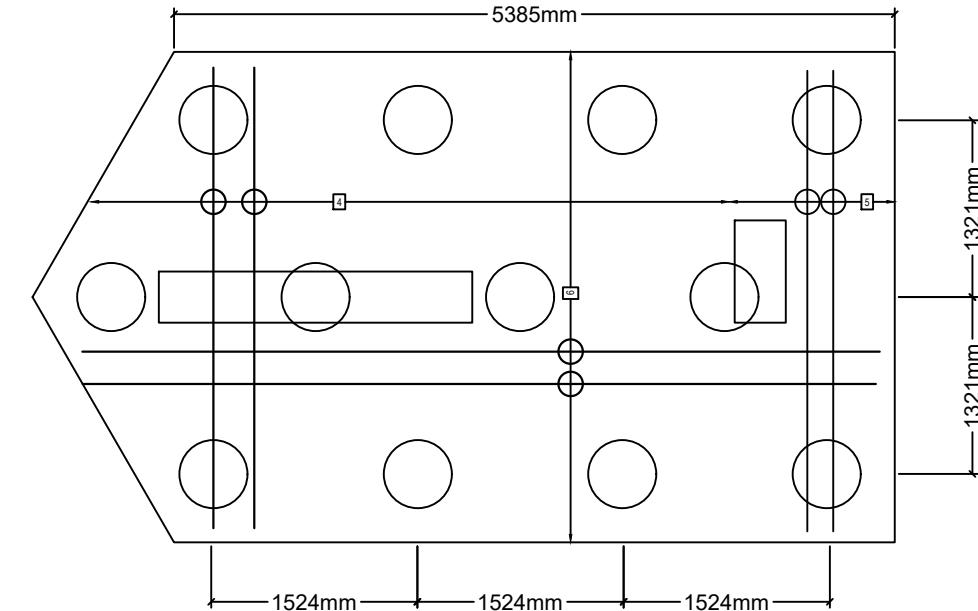


Pile Cap 5P2

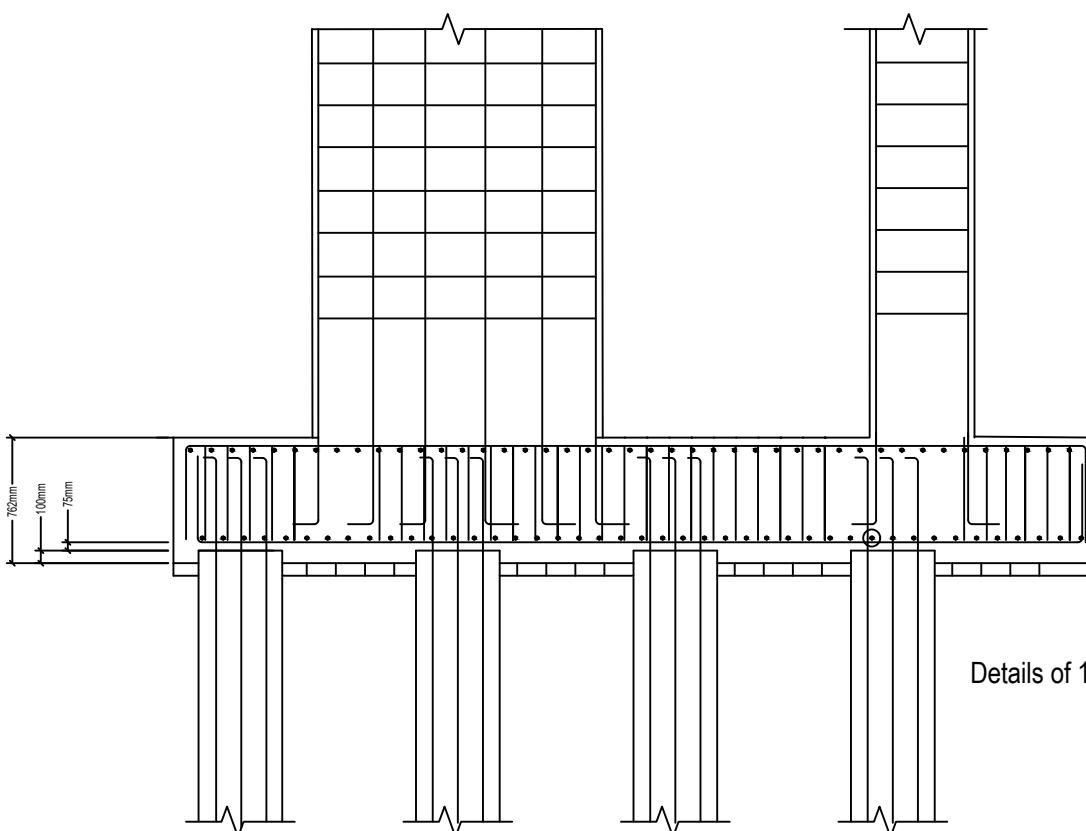
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DRWING TITLE	PILE CAP DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



Bottom rod



Top rod



pile cap 12P

LEGEND:

BOTTOM ROD

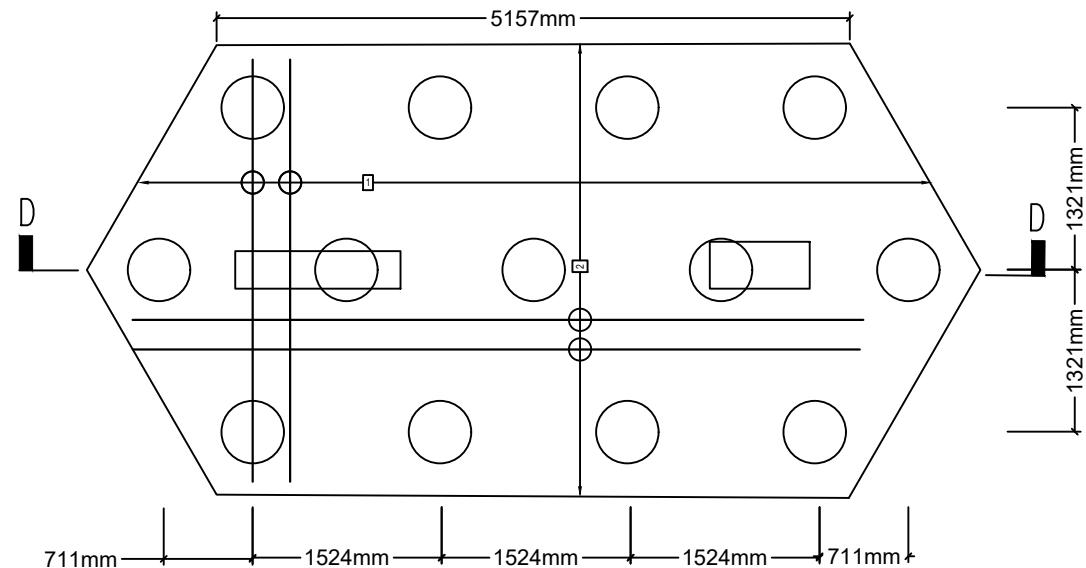
1. 20Ø @ 100mm c/c
2. 20Ø @ 75mm c/c
3. 20Ø @ 125mm c/c

LEGEND:

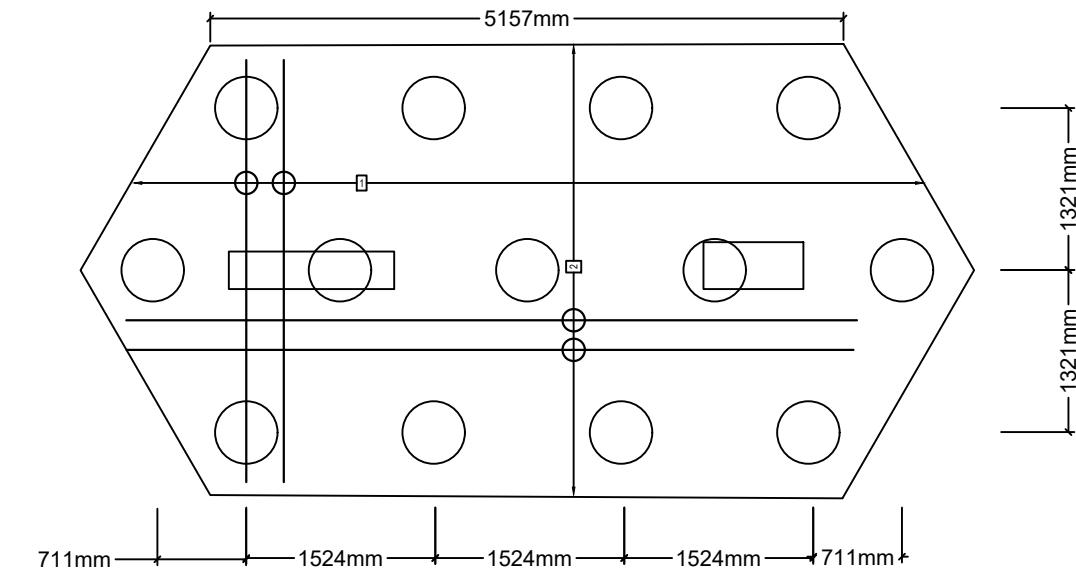
TOP ROD

1. 16Ø @ 100mm c/c
2. 16Ø @ 75mm c/c
3. 16Ø @ 125mm c/c

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER					
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DRWING TITLE	PILE CAP DETAILING				ENGENIUS			BRIDGE BUILDERS			

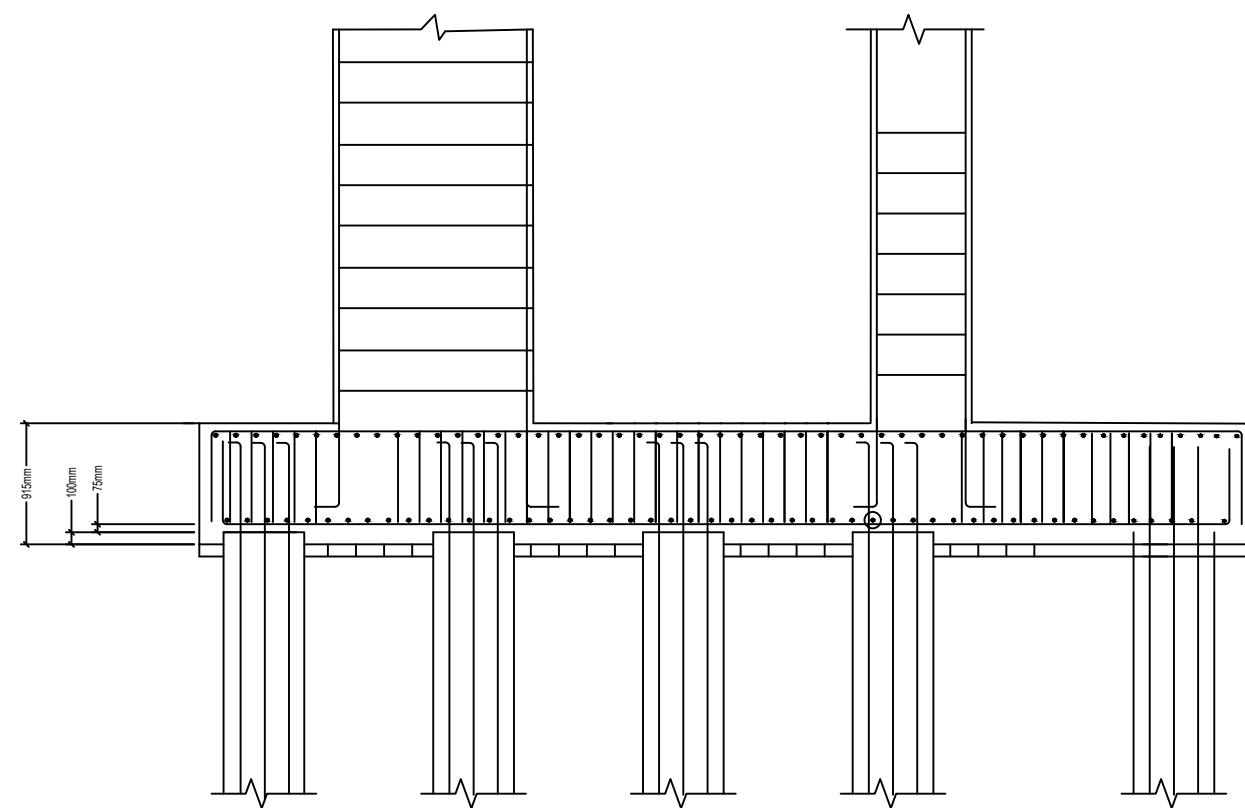


Bottom rod



Top rod

pile cap 13P



Details of 13P Sec: D-D

#### LEGEND:

#### BOTTOM ROD

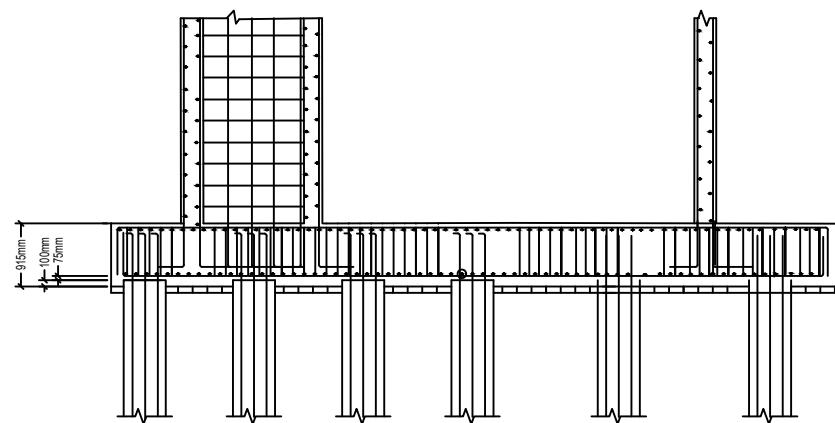
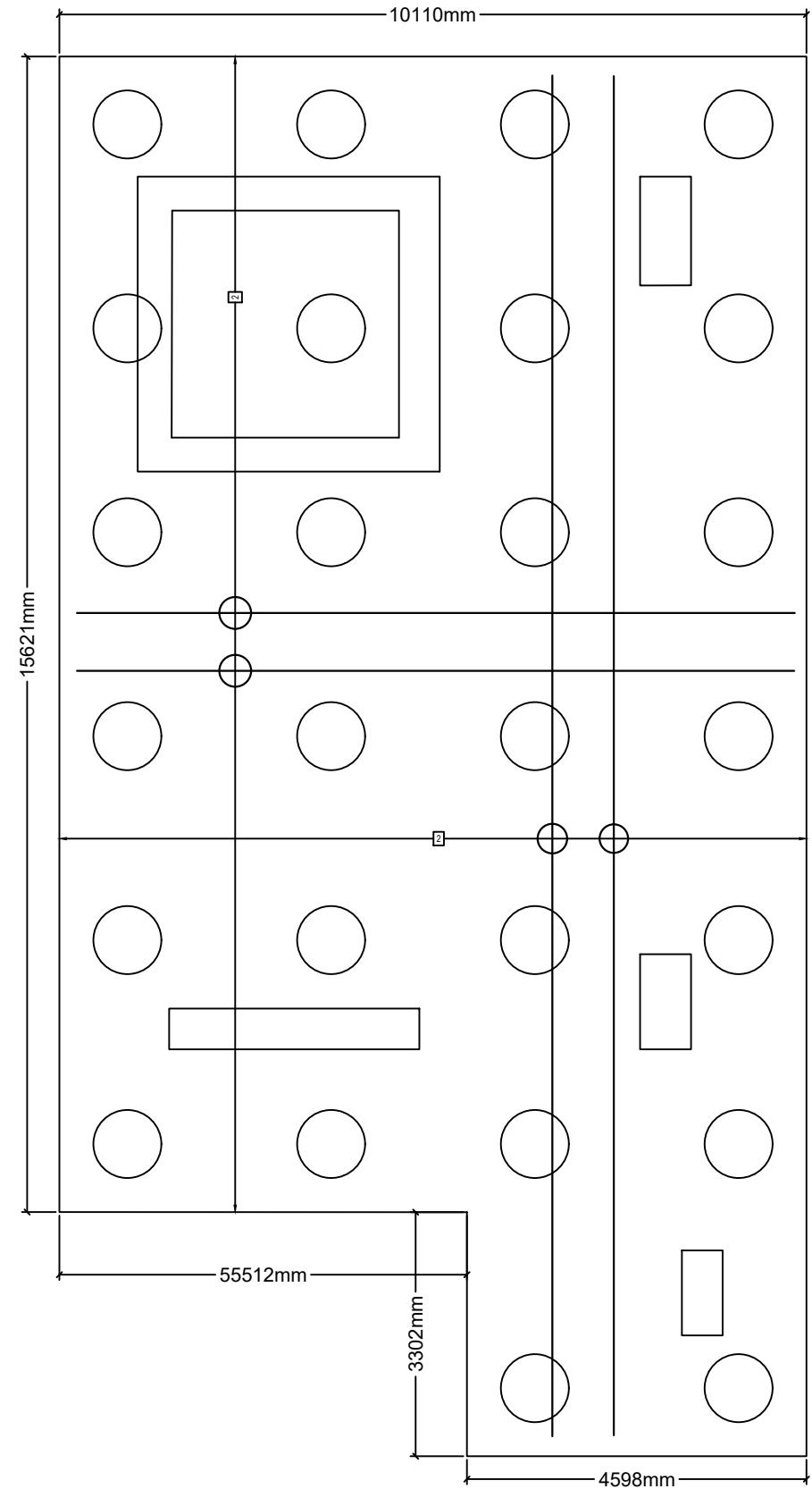
1. 20Ø @ 100mm c/c
2. 20Ø @ 125mm c/c

#### LEGEND:

#### TOP ROD

1. 16Ø @ 100mm c/c
2. 16Ø @ 125mm c/c

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			PILE CAP 13P						
DRWING TITLE	PILE CAP DETAILING	14			ENGENIUS	BRIDGE BUILDERS			
							02	20-12-24	
							01	01-12-24	
							REV	DATE	DESCRIPTION



LEGEND:

BOTTOM ROD

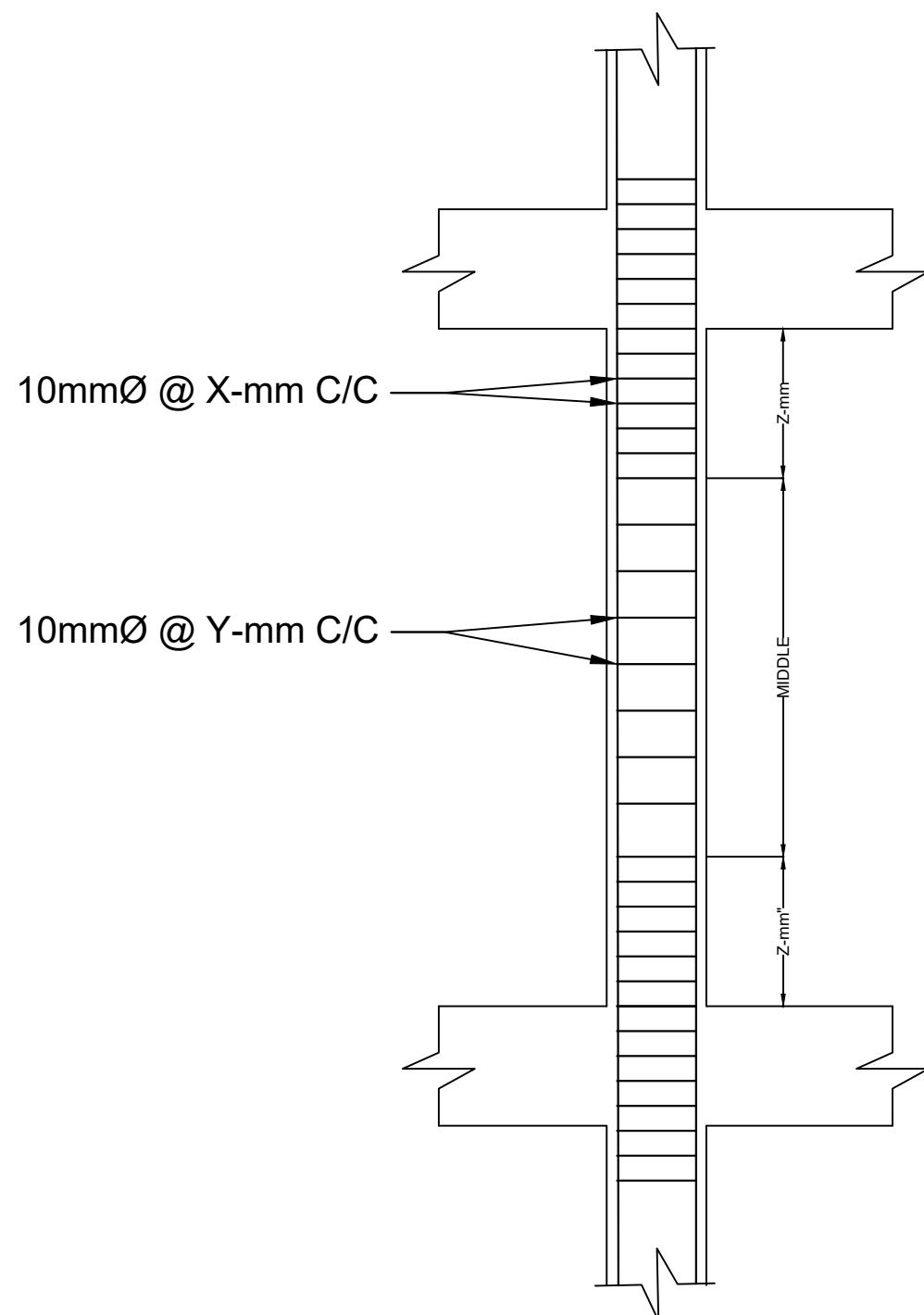
1.  $20\varnothing @ 125\text{mm c/c}$
2.  $20\varnothing @ 125\text{mm c/c}$

LEGEND:

TOP ROD

1.  $16\varnothing @ 125\text{mm c/c}$
2.  $16\varnothing @ 125\text{mm c/c}$

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			PILE CAP 13P			BRIDGE BUILDERS			
DRWING TITLE	PILE CAP DETAILING		15		ENGENIUS		02 01	20-12-24 01-12-24	



LEGEND:

1. FOR C1 & C3 ( x =90mm, y=180mm z=813mm)

2.FOR C2 & C7 ( x =75mm, y=150mm z=635mm)

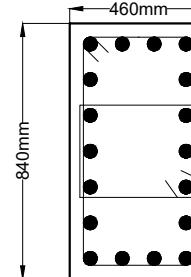
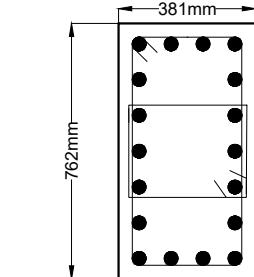
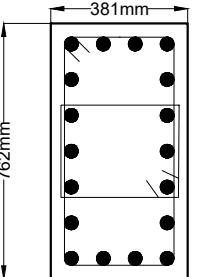
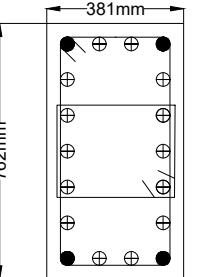
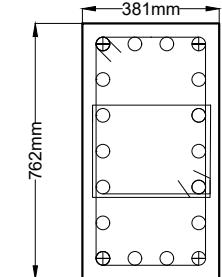
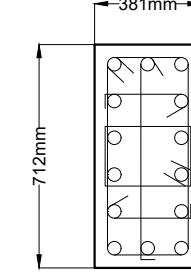
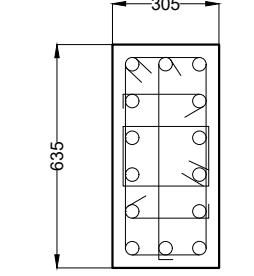
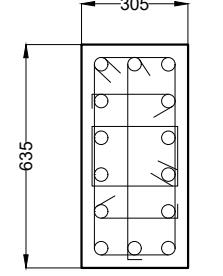
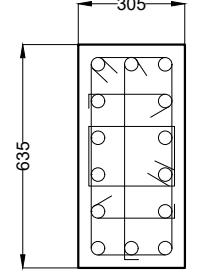
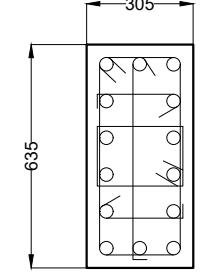
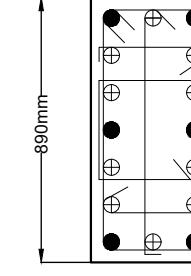
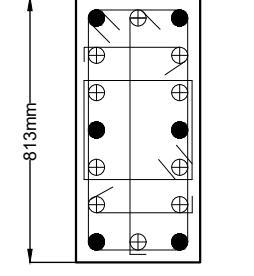
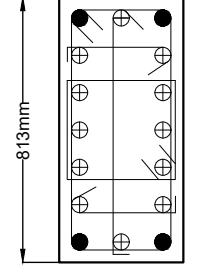
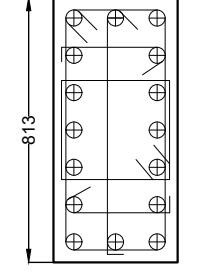
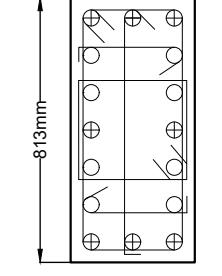
3.FOR C4 ( x =75mm, y=150mm z=762mm)

4.FOR C5 & C6 ( x =90mm, y=180mm z=508mm)

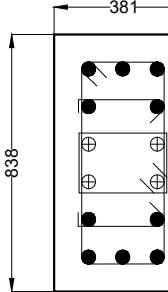
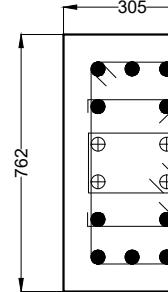
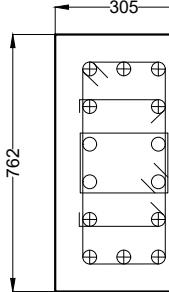
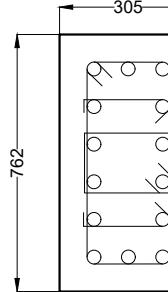
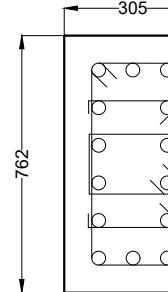
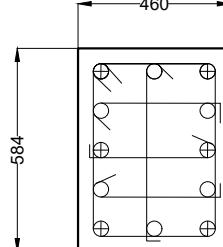
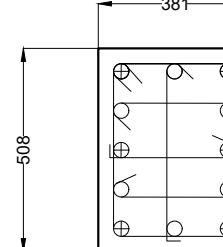
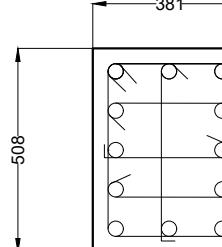
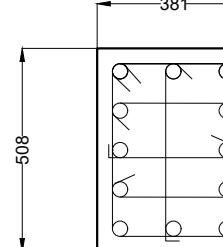
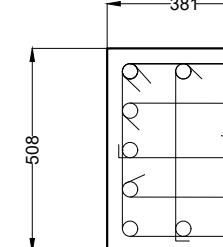
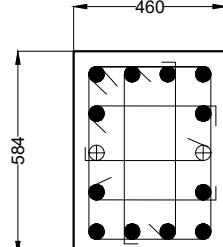
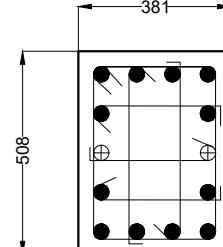
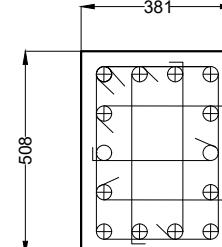
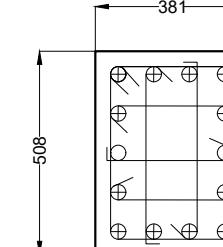
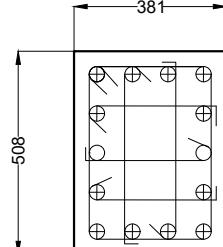
5.FOR C8 & C9 ( x =90mm, y=180mm z=712mm)

## COLUMN X SECTION

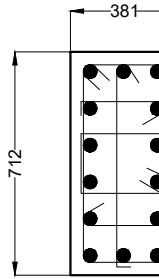
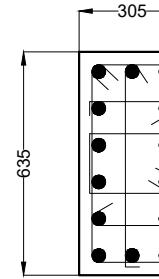
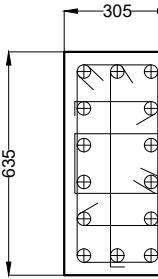
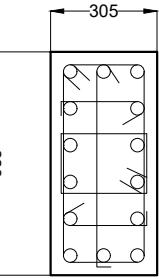
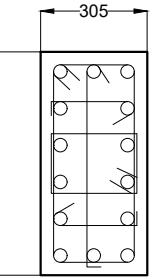
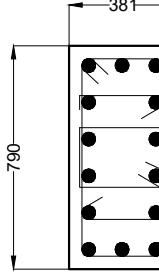
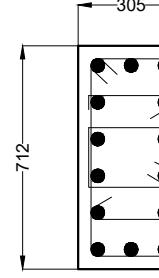
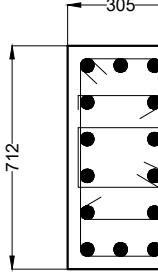
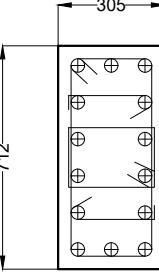
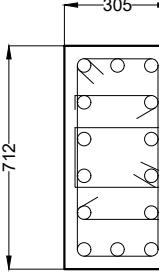
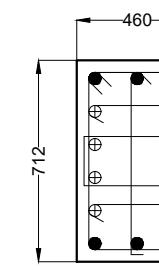
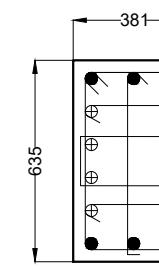
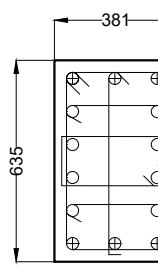
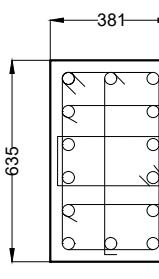
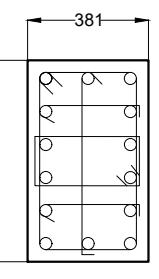
PROJECT -ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		COLUMN LONG SECTION	16		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	COLUMN SCHEDULE							
							02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

COLUMN SCHEDULE					
COLUMN	BELLOW GROUND FLOOR	Ground Floor TO 1st Floor	2nd to 3rd floor	4th TO 5TH FLOOR	6TH TO TOP FLOOR
C1	 C1 (460mm x 840mm) 18-25 mmØ Tie bar 12mmØ	 C1 (381mm x 762mm) 18-25 mmØ Tie bar 12mmØ	 C1 (381mm x762mm ) 18-25 mmØ Tie bar 12mmØ	 C1 (381mm x762mm ) 4-25 mm+4-20mmØ Tie bar 12mmØ	 C1 (381mm x762mm ) 4-20 mm+4-16mmØ Tie bar 12mmØ
C2	 C2 (381mm X 712mm) 14-16mmØ Tie bar 10mmØ	 C2 (305mm X 635mm) 14-16mmØ Tie bar 10mmØ	 C2 (305mm X 635mm) 14-16mmØ Tie bar 10mmØ	 C2 (305mm X 635mm) 14-16mmØ Tie bar 10mmØ	 C2 (305mm X 635mm) 14-16mmØ Tie bar 10mmØ
C3	 C3 ( 460mm X 890mm) 10-20mm+6-25mmØ Tie bar 10mmØ	 C3 (381mm X 813mm) 10-20mm+6-25mmØ Tie bar 10mmØ	 C3 (381mm X 813mm) 12-20mm+4-25mmØ Tie bar 10mmØ	 C3 (381mm X 813mm) 16-20mmØ Tie bar 10mmØ	 C3 (381mm X 813mm) 8-20mm+8-16mmØ Tie bar 10mmØ

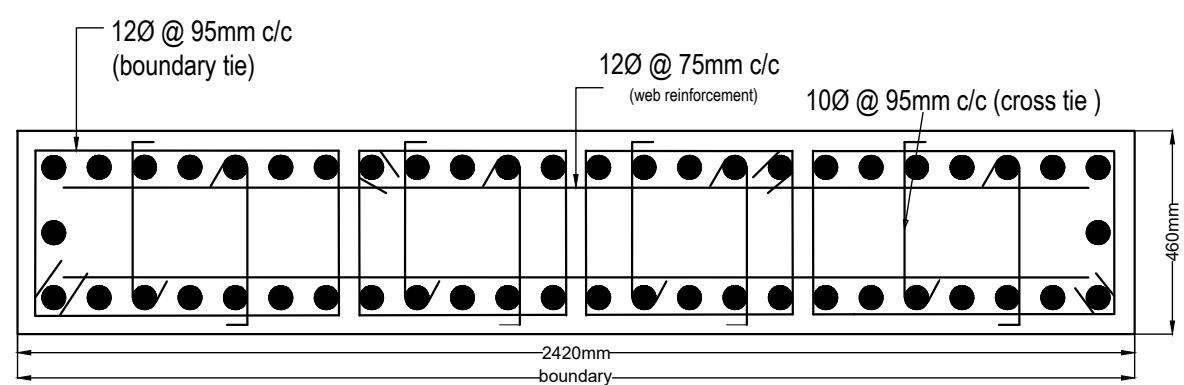
PROJECT -ENGINIUS		SHEET TITLLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			C1 ,C2, C3 SCHEDULE			BRIDGE BUILDERS			
DRWING TITLE	COLUMN SCHEDULE		17		ENGINIUS		02 20-12-24	01 01-12-24	REV DATE DESCRIPTION

COLUMN SCHEDULE					
COLUMN	BELLOW GROUND FLOOR	Ground Floor TO 1st Floor	2nd to 3rd floor	4th TO 5TH FLOOR	6TH TO TOP FLOOR
C4	 <p>C4( 381mm X 838mm) 10-25mm+4-20mmØ Tie bar 10mmØ</p>	 <p>C4 (305mm X 762mm) 10-25mm+4-20mmØ Tie bar 10mmØ</p>	 <p>C4 (305mm X 762mm) 10-20mm+4-16mmØ Tie bar 10mmØ</p>	 <p>C4 (305mm X 762mm) 14-16mmØ Tie bar 10mmØ</p>	 <p>C4 (305mm X 762mm) 14-16mmØ Tie bar 10mmØ</p>
C5	 <p>C5( 460mm X 584mm) 6-20mm+6-16mmØ Tie bar 10mmØ</p>	 <p>C5 (381mm X 508mm ) 6-20mm+6-16mmØ Tie bar 10mmØ</p>	 <p>C5 (381mm X 508mm ) 12-16mmØ Tie bar 10mmØ</p>	 <p>C5 (381mm X 508mm ) 12-16mmØ Tie bar 10mmØ</p>	 <p>C5 (381mm X 508mm ) 12-16mmØ Tie bar 10mmØ</p>
C6	 <p>C6( 460mm X 584mm) 12-25mm+2-20mmØ Tie bar 10mmØ</p>	 <p>C6 (381mm X 508mm) 12-25mm+2-20mmØ Tie bar 10mmØ</p>	 <p>C6 (381mm X 508mm) 12-20mm+2-16mmØ Tie bar 10mmØ</p>	 <p>C6 (381mm X 508mm) 14-16mmØ Tie bar 10mmØ</p>	 <p>C6 (381mm X 508mm) 14-16mmØ Tie bar 10mmØ</p>

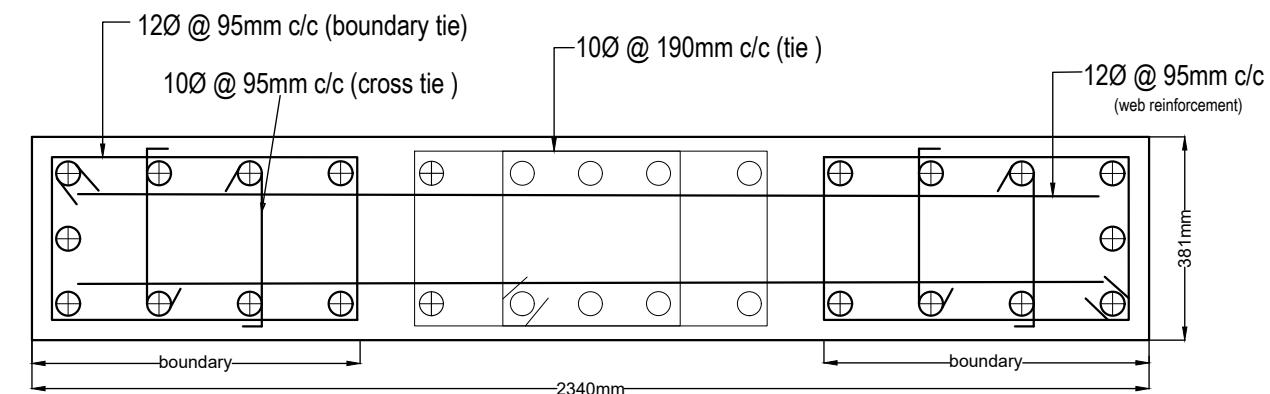
PROJECT -ENGINIUS		SHEET TITLLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			C4 ,C5, C6 SCHEDULE			ENGENIUS			
DRWING TITLE	COLUMN SCHEDULE		18			BRIDGE BUILDERS	02	20-12-24	
							01	01-12-24	
							REV	DATE	
							DESCRIPTION		

COLUMN SCHEDULE					
COLUMN	BELLOW GROUND FLOOR	Ground Floor to 1st Floor	2nd to 3rd floor	4th TO 5TH FLOOR	6TH TO TOP FLOOR
C7	 C7( 381mm X 712mm) 14-25mmØ Tie bar 10mmØ	 C7( 305mmX 635mm) 14-25mmØ Tie bar 10mmØ	 C7( 305mm X 635mm) 14-20mmØ Tie bar 10mmØ	 C7( 305mm X 635mm) 14-16mmØ Tie bar 10mmØ	 C7( 305mm X 635mm) 14-16mmØ Tie bar 10mmØ
C8	 C8( 381mm X 790mm) 14-25mmØ Tie bar 10mmØ	 C8 (305mm X 712mm) 14-25mmØ Tie bar 10mmØ	 C8 (305mm X 712mm) 14-25mmØ Tie bar 10mmØ	 C8 (305mm X 712mm) 14-20mmØ Tie bar 10mmØ	 C8 (305mm X 712mm) 14-16mmØ Tie bar 10mmØ
C9	 C9( 460mm X 712mm) 6-25mm+8-20mmØ Tie bar 10mmØ	 C9( 381mm X 635mm) 6-25mm+8-20mmØ Tie bar 10mmØ	 C9( 381mm X 635mm) 6-20mm+8-16mmØ Tie bar 10mmØ	 C9( 381mm X 635mm) 14-16mmØ Tie bar 10mmØ	 C9( 381mm X 635mm) 14-16mmØ Tie bar 10mmØ

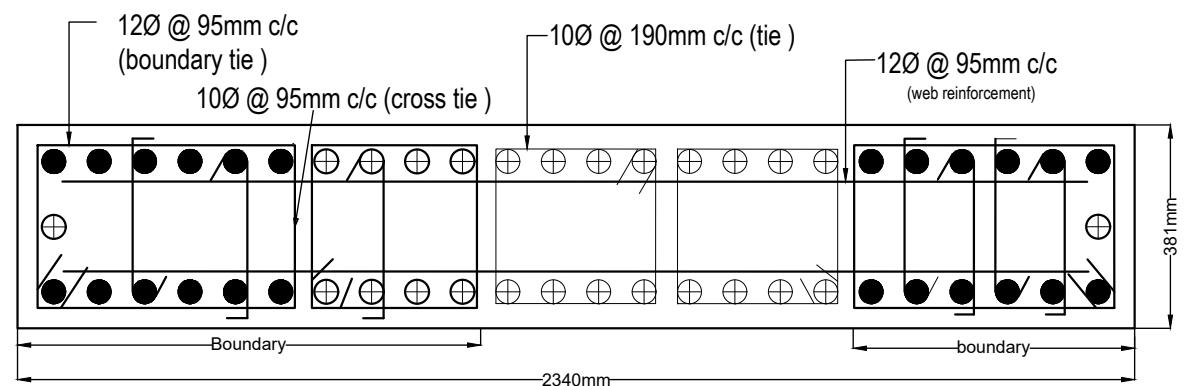
PROJECT -ENGINIUS		SHEET TITLLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			C7 ,C8, C9 SHEDULE			BRIDGE BUILDERS			
DRWING TITLE	COLUMN SCHEDULE		19		ENGENIUS		02 20-12-24		
							01 01-12-24		
							REV DATE	DESCRIPTION	



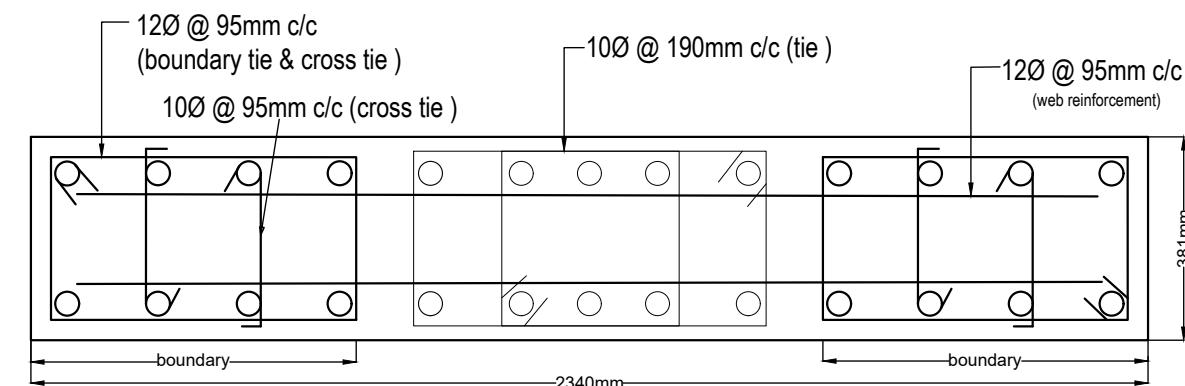
50-25mmØ  
(S.W. 1)- BELOW GROUND



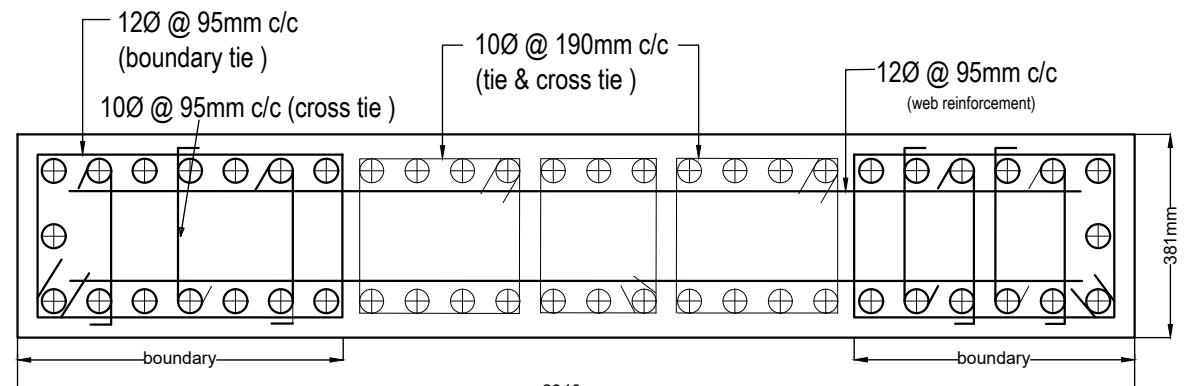
20-20mm+8-16 mmØ (144mm spacing ceinter to center)  
(S.W. 1) 2nd floor



24-25mm+26-20mmØ  
(S.W.1)- GROUND FLOOR



26-16 mmØ  
(S.W. 1) 3rd floor to roof

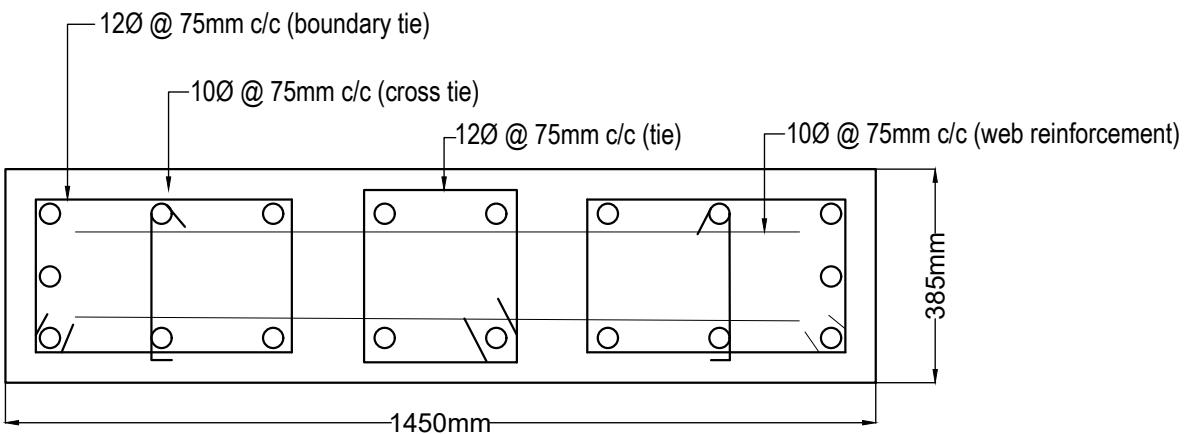


50-20mmØ(72mm spacing center to center)  
(S.W. 1) - 1ST FLOOR

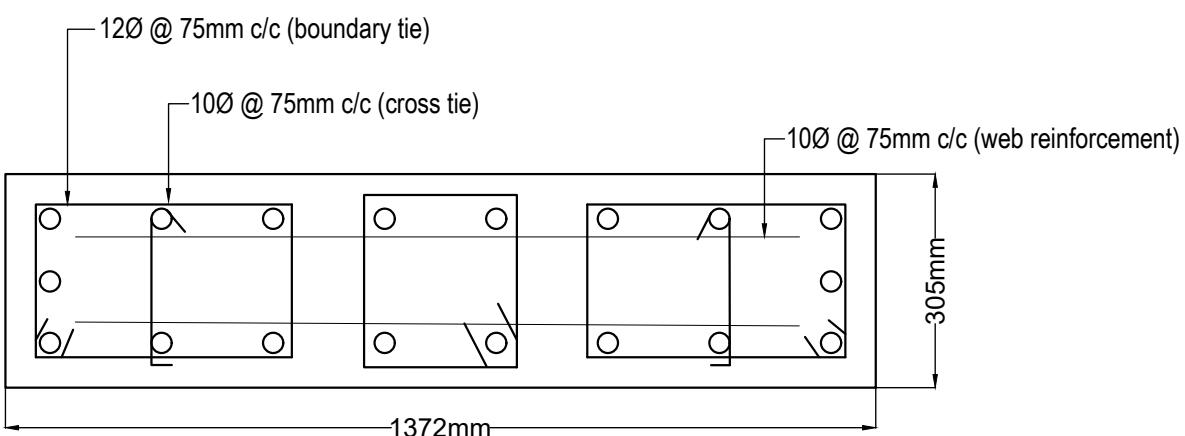
#### LEGEND:

0. Below ground special boundary condition will be applied on whole wall.
1. For boundary tie 12 mmØ and cross tie 10mmØ has been used.
2. All ties and cross ties inside the boundary element and boundary tie itself should maintain 95 mm c/c .
3. For general tie 10mmØ has been used , tie distance is 190mmØ c/c.
- 4.In term of web reinforcement 75mm c/c distance has maintained only below ground ,and from ground to roof 95 mm c/c distance has maintained.

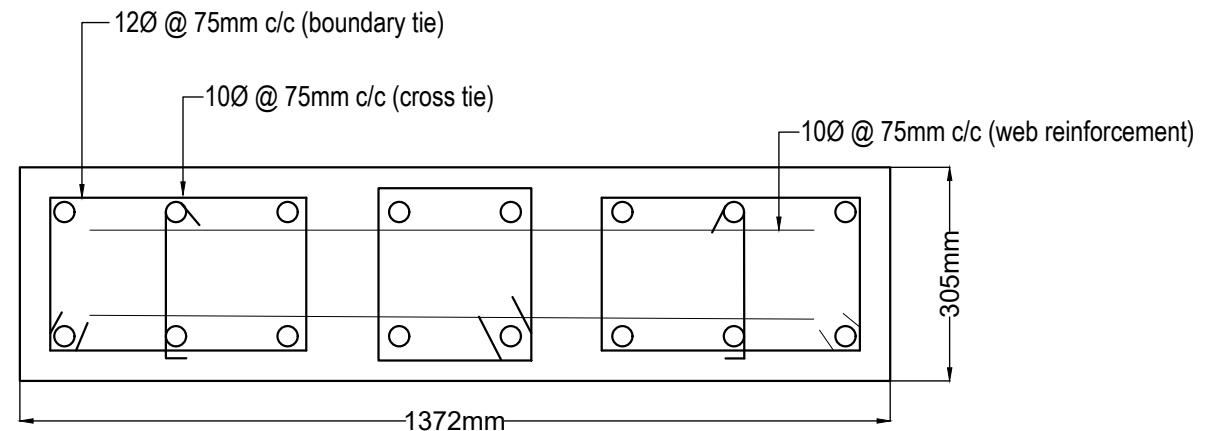
PROJECT -ENGENIUS		SHEET TITLLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER						
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			S.W. 1-DETAILING			20						
DRWING TITLE	SHEAR WALL DETAILING				ENGENIUS	BRIDGE BUILDERS	02	20-12-24	01	01-12-24	REV DATE	DESCRIPTION



18-16mmØ  
(S.W. 2) - BELOW GROUND



18-16mmØ  
(S.W. 2) - GROUND to THIRD FLOOR

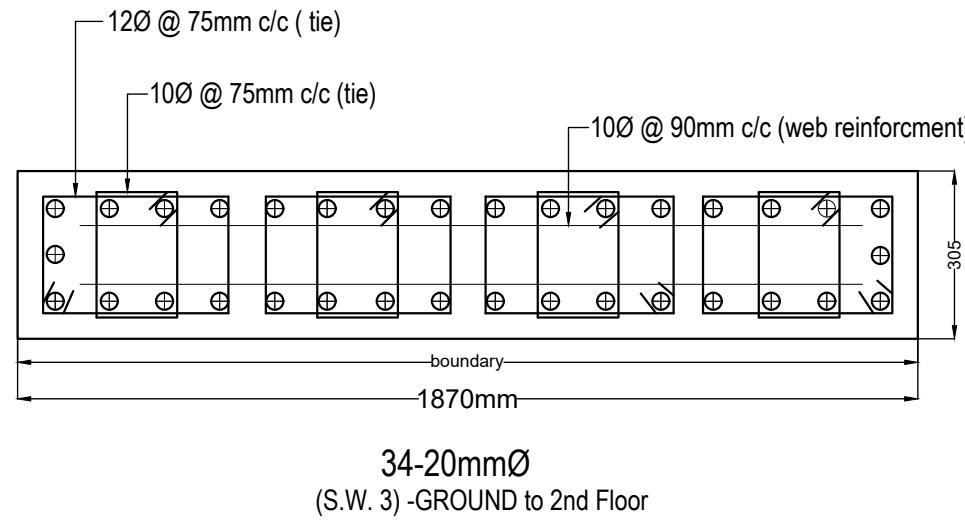
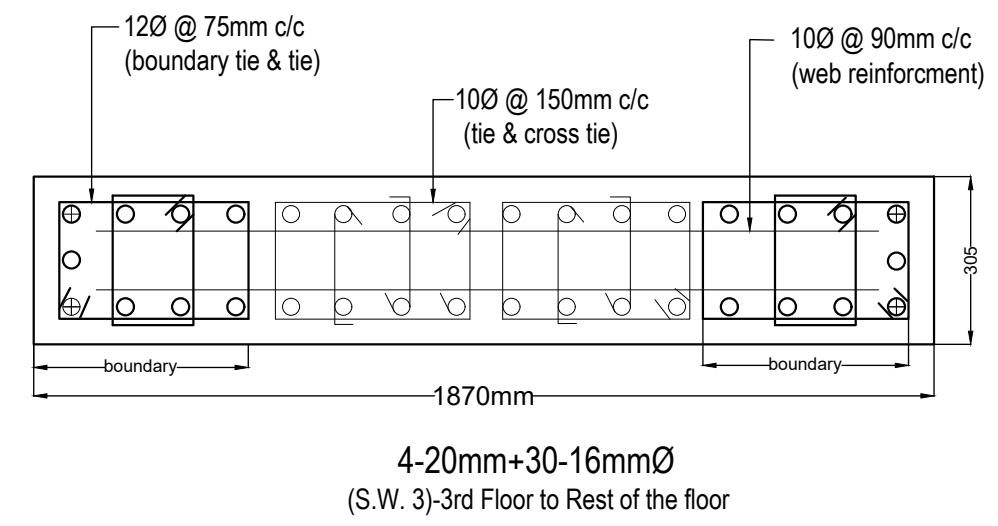
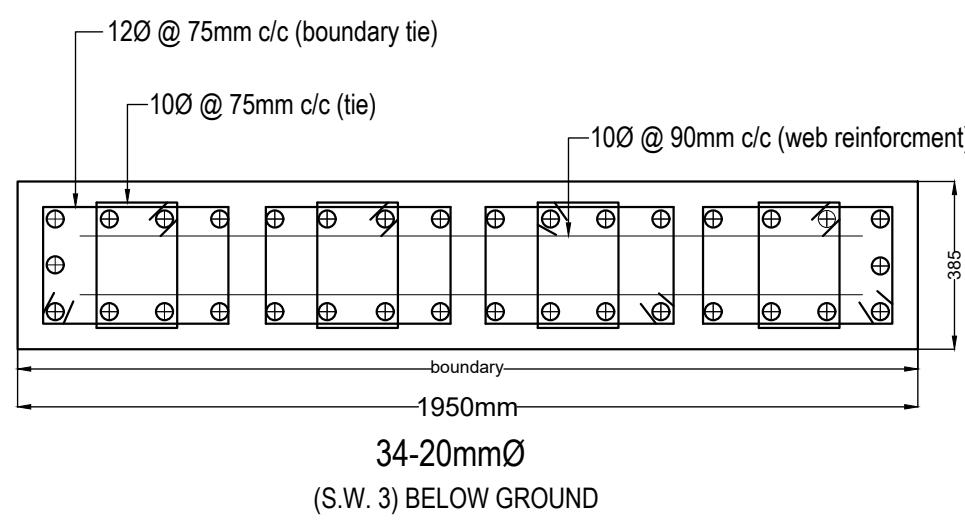


16-16mmØ  
(S.W. 2) - 4th to Rest of the Floor

LEGEND:

1. special boundary condition has been applied on whole wall from ground to roof.
2. For boundary tie 12 mmØ and cross tie 10mmØ has been used.

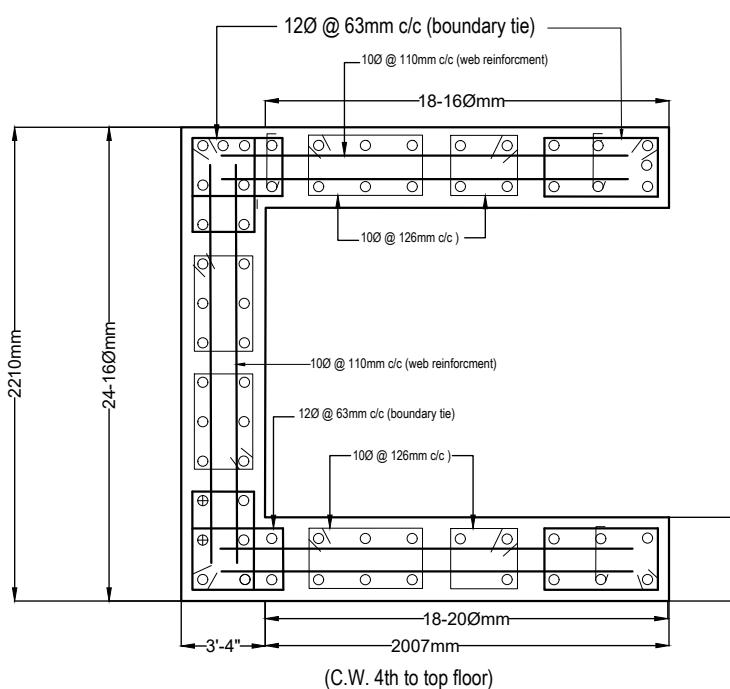
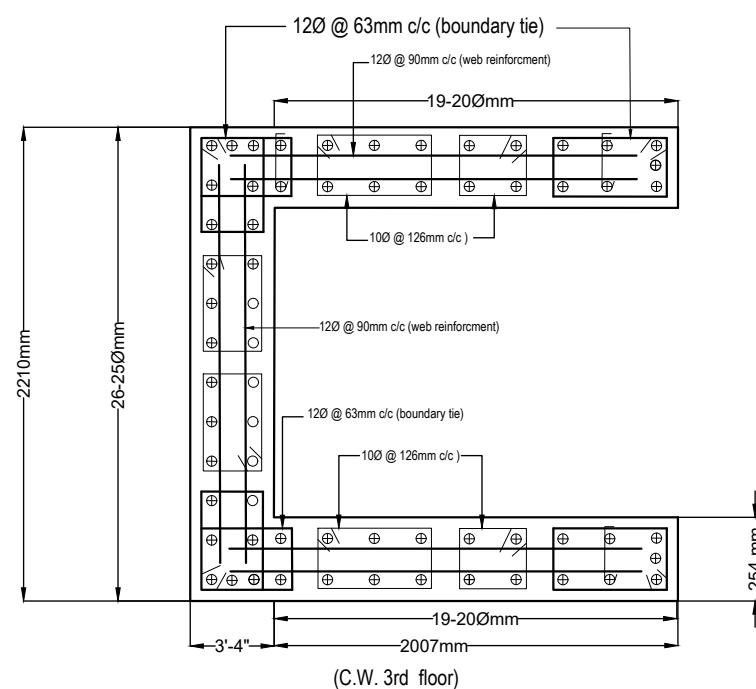
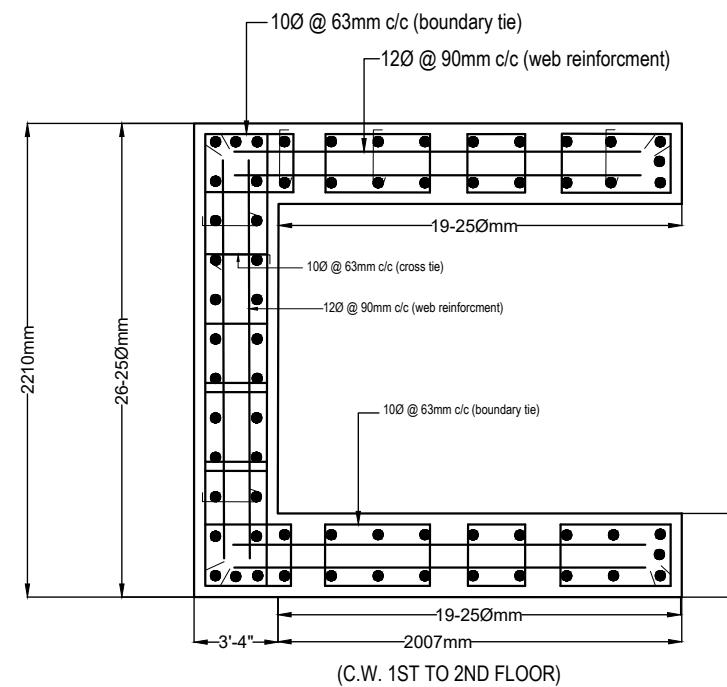
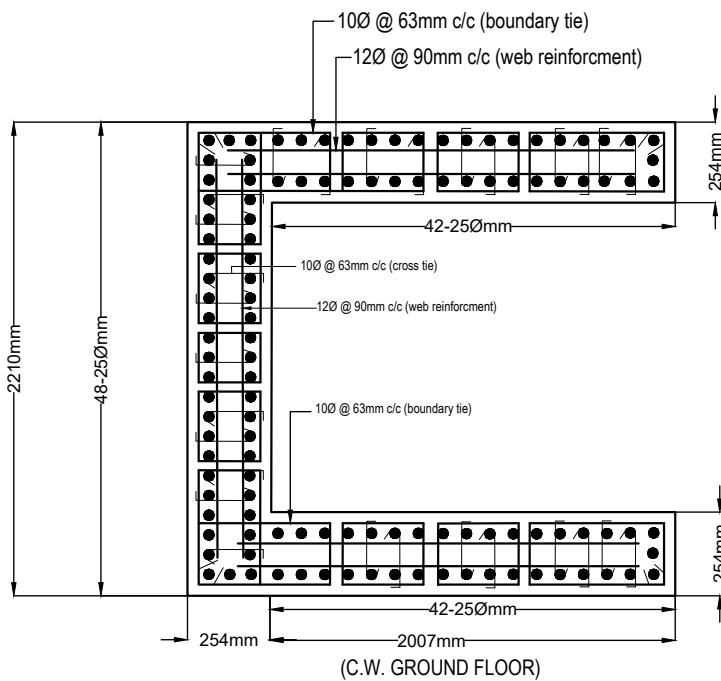
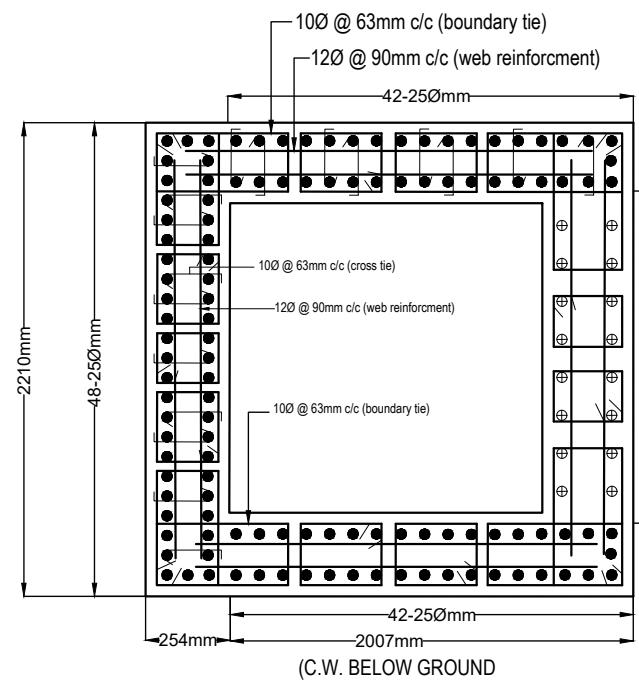
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER								
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			S.W.2-DETAILING			21			ENGENIUS			BRIDGE BUILDERS		
DRWING TITLE	SHEAR WALL DETAILING						02	20-12-24				01	01-12-24	
							REV	DATE	DESCRIPTION					



#### LEGEND:

1. special boundary condition has been applied on whole wall from ground to 2nd floor.
2. For tie 12 mmØ and inner tie 10mmØ has been used.

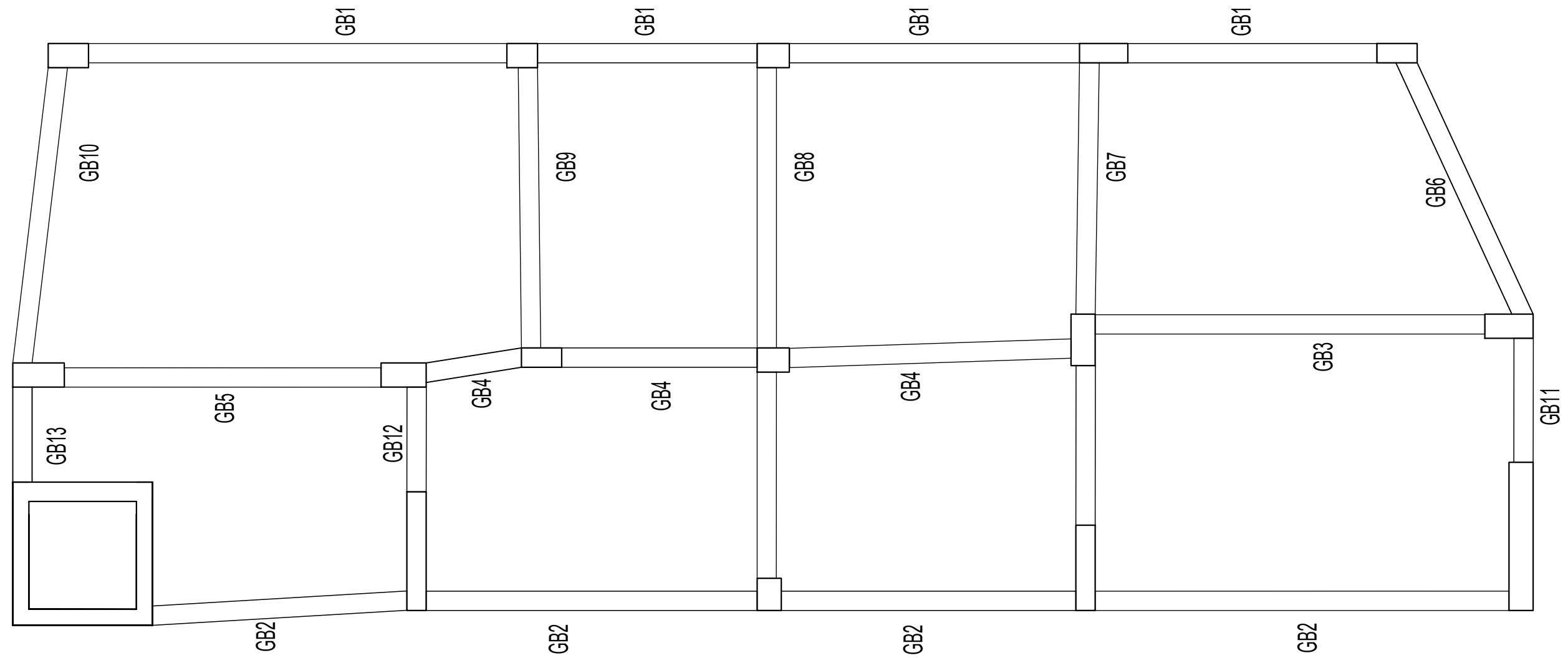
PROJECT -ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		S.W.3-DETAILING	22		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	SHEAR WALL DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



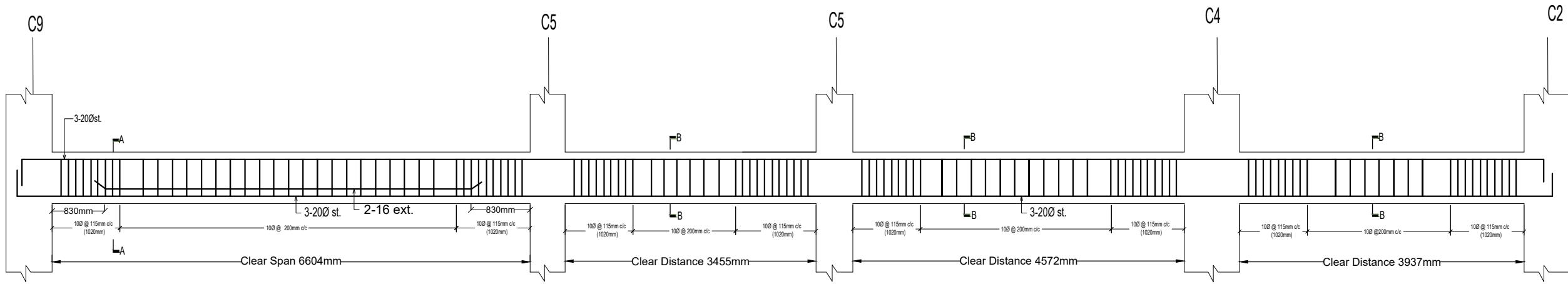
### LEGEND:

- From base to 2nd floor special boundary condition will be applied on whole wall.

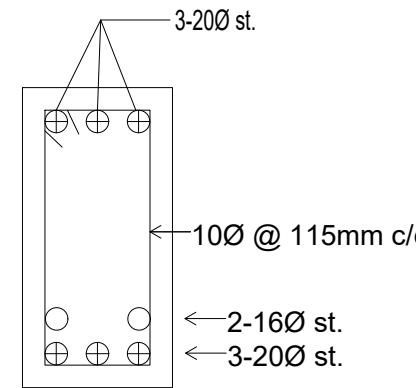
PROJECT - ENGENIUS	SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING	C.W -DETAILING	23		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	CORE WALL					02 20-12-24	01 01-12-24



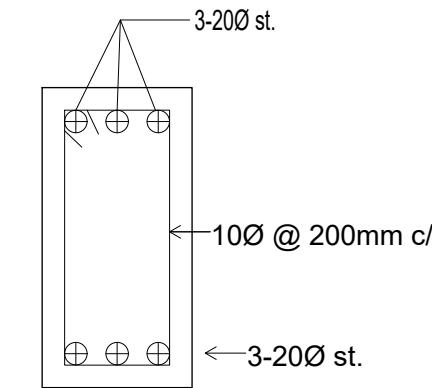
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER					
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GRADE BEAM LAYOUT	24		ENGENIUS	BRIDGE BUILDERS					
DRWING TITLE	GRADE BEAM LAYOUT						REV	DATE			
A	B	C	D	E	F	G	H	I	J	K	L



(GB1-305mmX508mm)

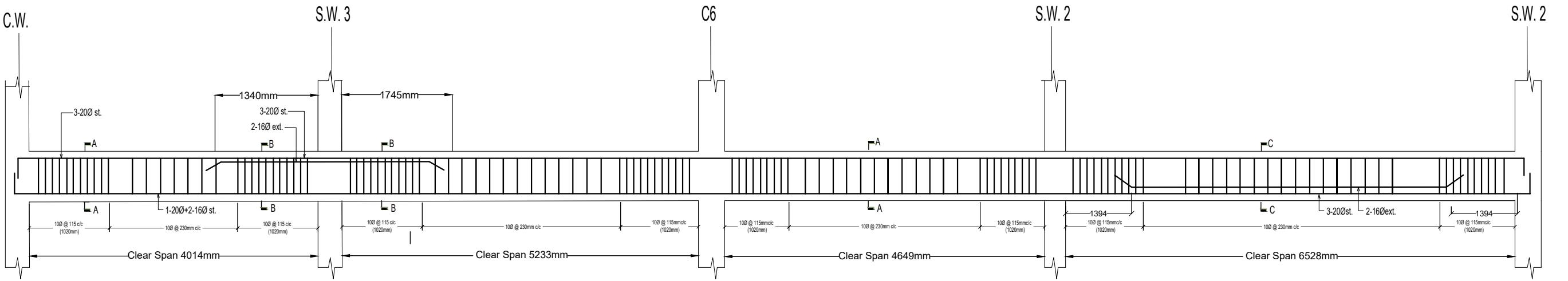


SECTION A-A

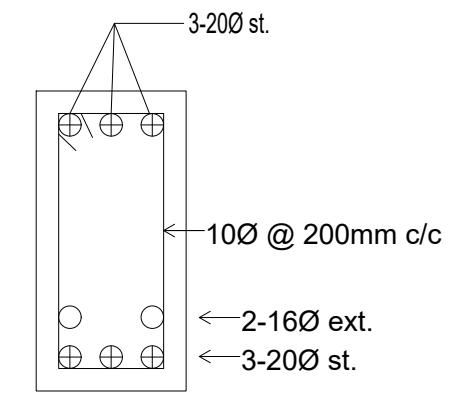
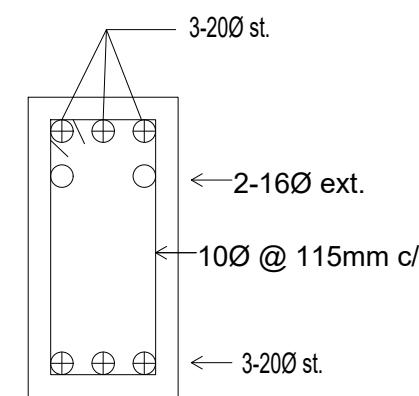
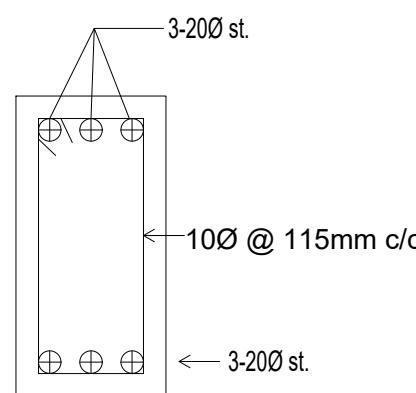


SECTION B-B

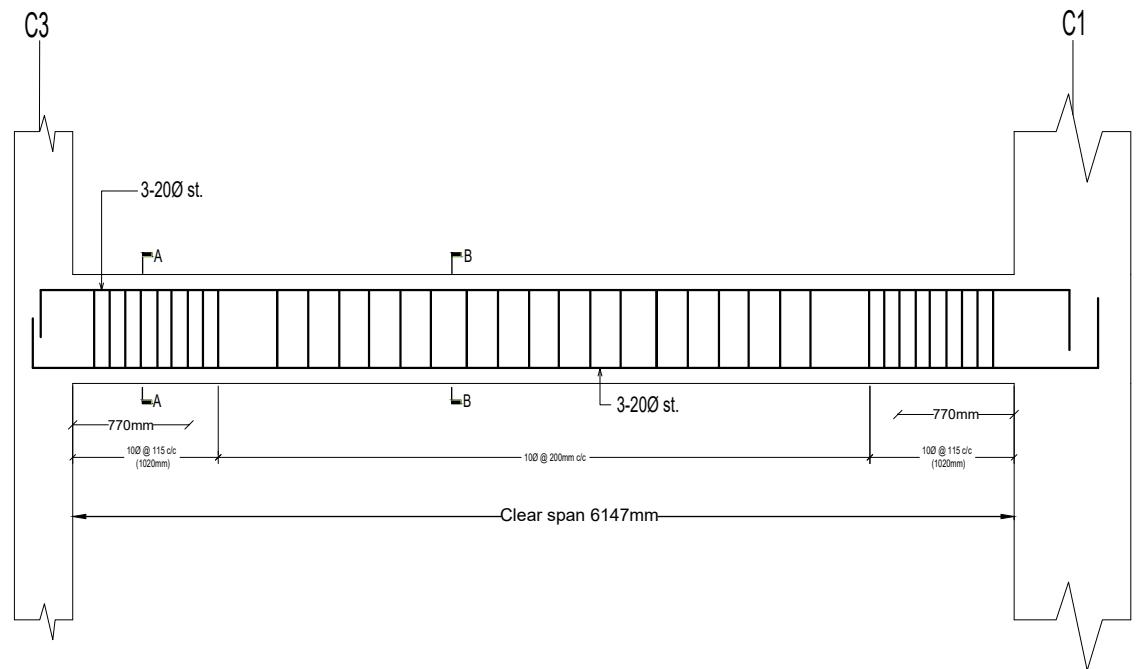
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GB1-DETAILING	25	ENGENIUS	BRIDGE BUILDERS				
DRWING TITLE	GRADE BEAM DETAILING								
							02	20-12-24	
							01	01-12-24	
							REV	DATE	DESCRIPTION
							K	L	SIGN



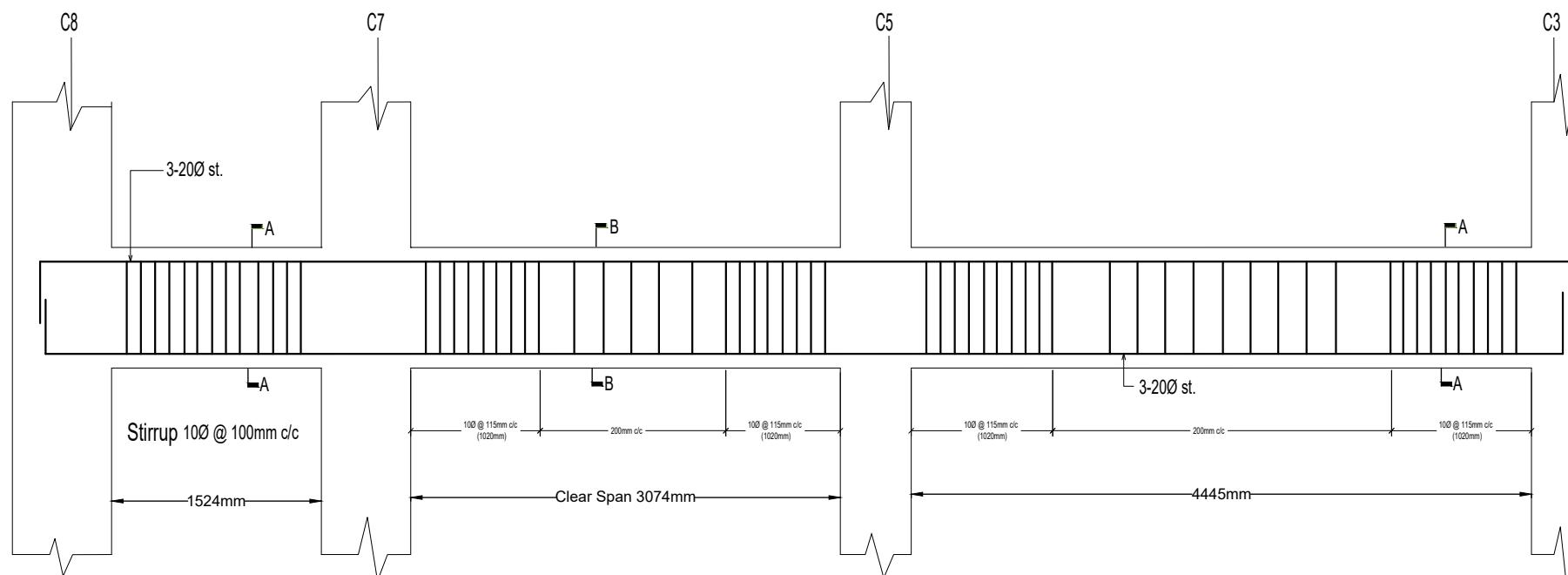
(GB2-305mmX508mm)



PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GB2-DETAILING	26		ENGENIUS	BRIDGE BUILDERS			
DRWING TITLE	GRADE BEAM DETAILING						02 20-12-24	01 01-12-24	
							REV	DATE	DESCRIPTION
							K	L	SIGN

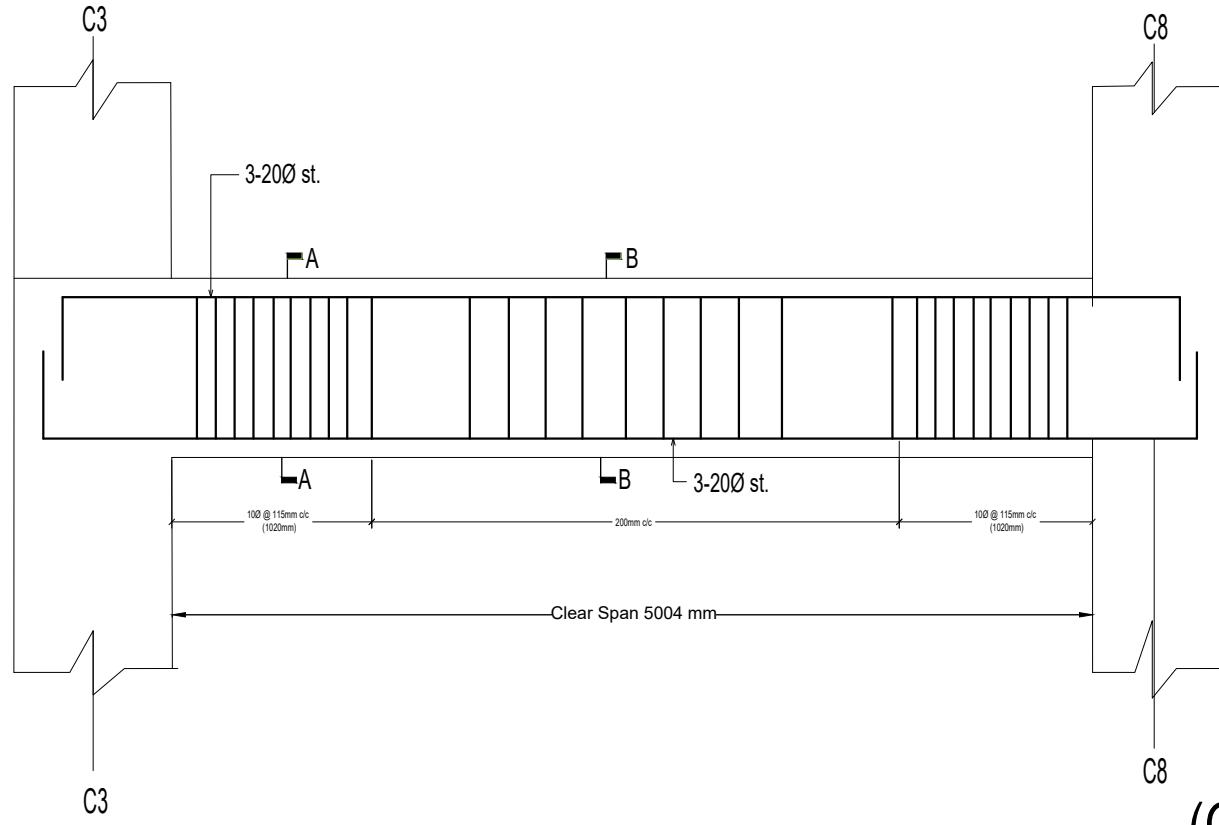


(GB3-305mmX508mm)

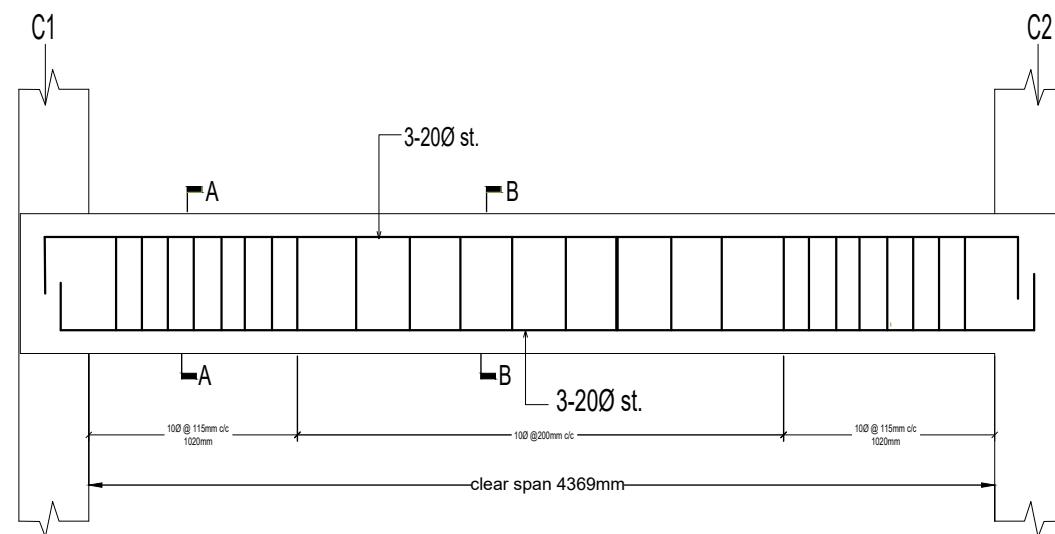


(GB4-305mmX508mm)

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GB3 & GB 4 -DETAILING		27	ENGENIUS		BRIDGE BUILDERS		
DRWING TITLE	GRADE BEAM DETAILING								
A	B	C	D	E	F	G	H	I	J
K	L								
02	20-12-24								
01	01-12-24								
REV	DATE	DESCRIPTION							
K	L	SIGN							

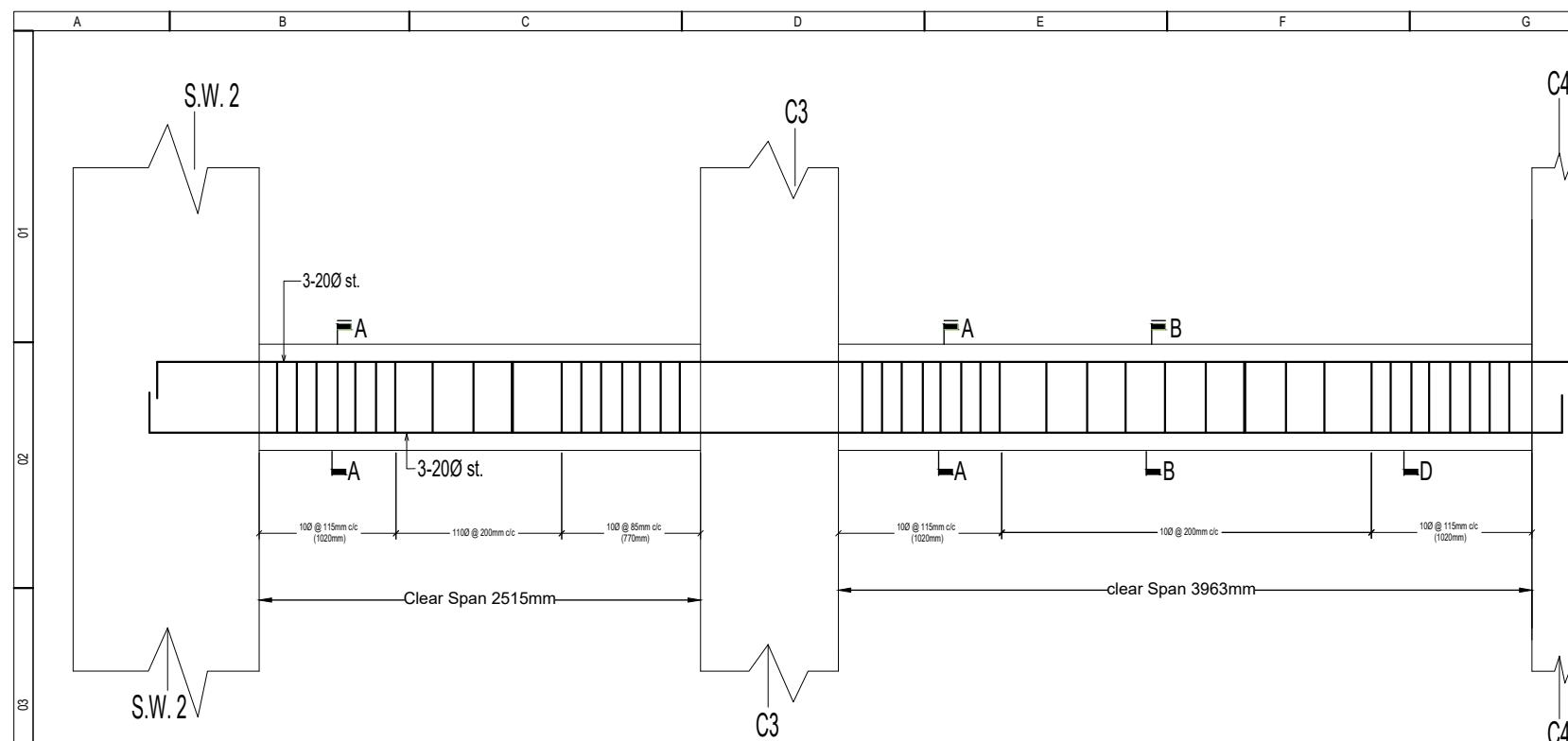


(GB5-305mmX508mm)

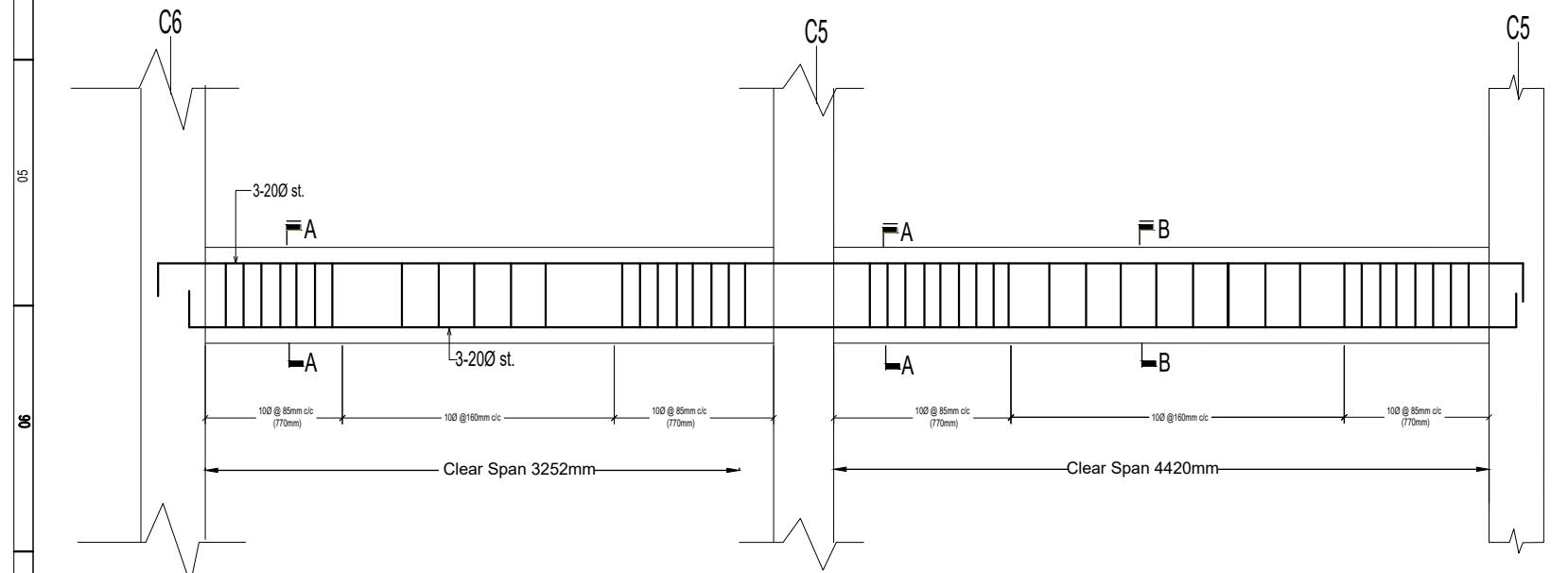


The diagram shows a rectangular column section labeled 'SECTION B-B'. It features four longitudinal bars (top and bottom) and three rows of transverse stirrups. The top row has two stirrups, and the bottom row has three stirrups. The stirrups are labeled '3-20Ø st.' at the top and '3-20Ø st.' at the bottom. A dimension line indicates '10Ø @ 200mm c/c' between the stirrups.

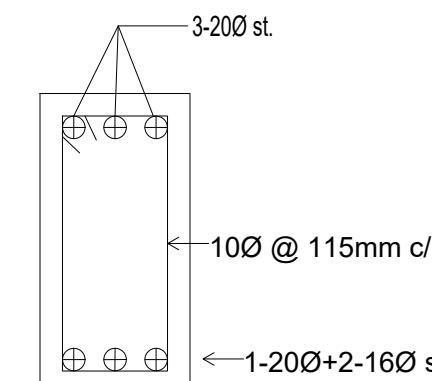
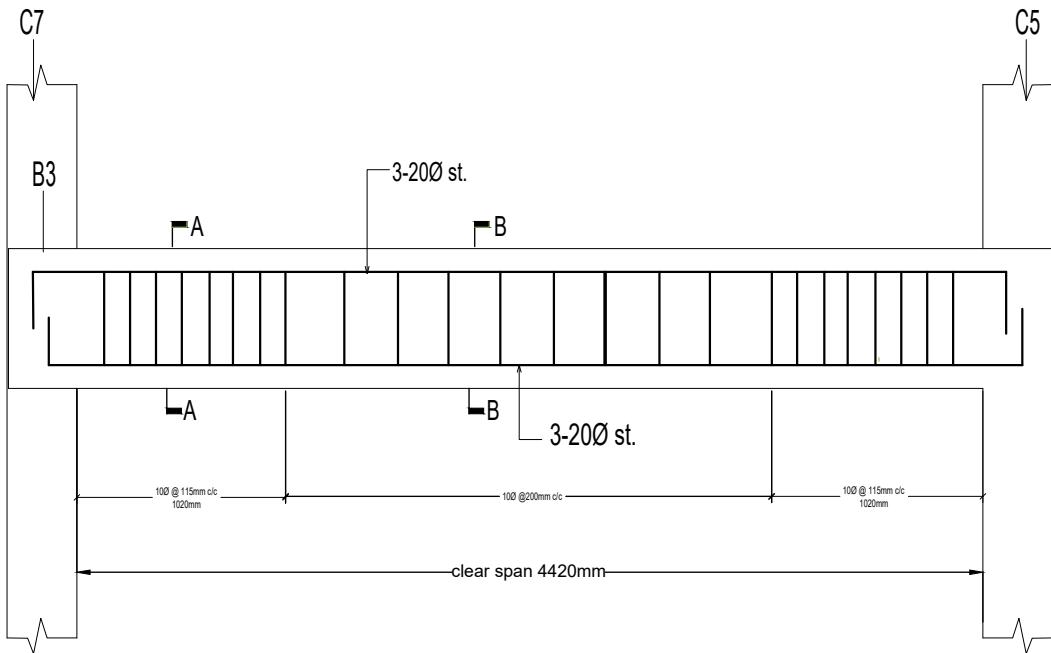
(GB6-305mmX508mm)



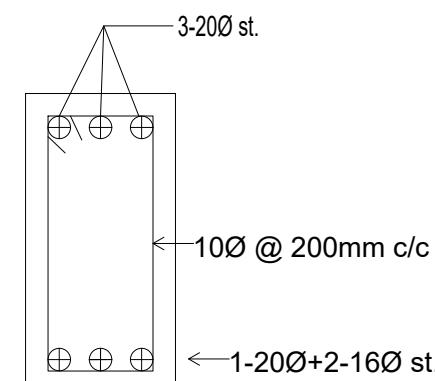
(GB7-305mmX508mm)



(GB8-305mmX508mm)

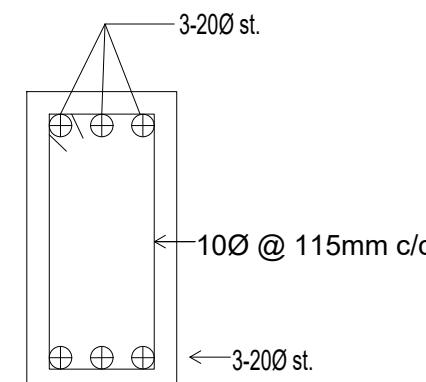
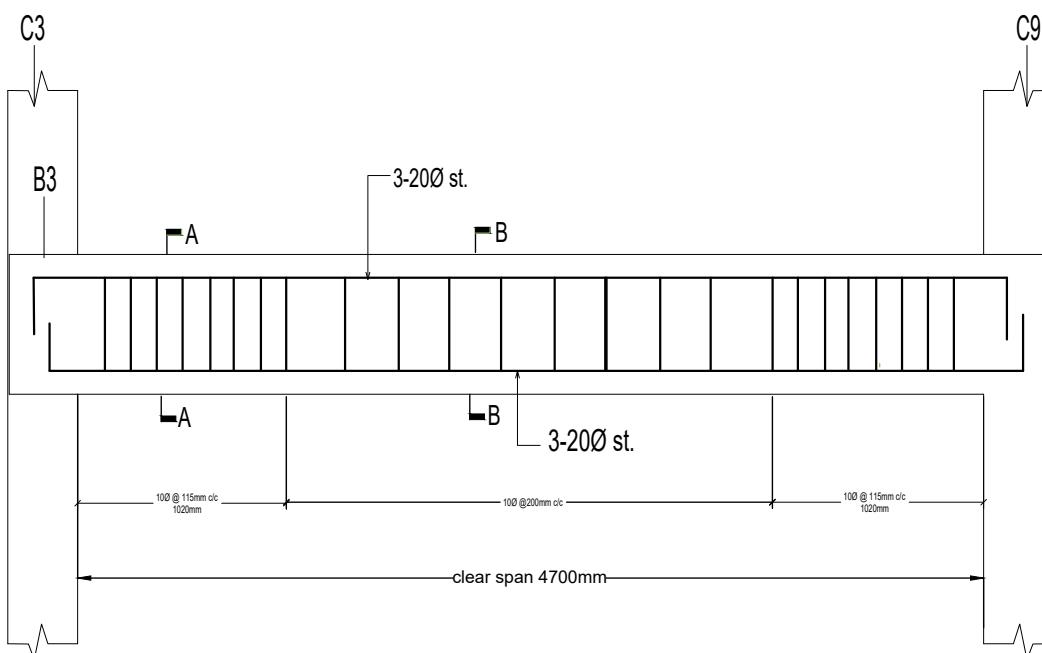


SECTION A-A

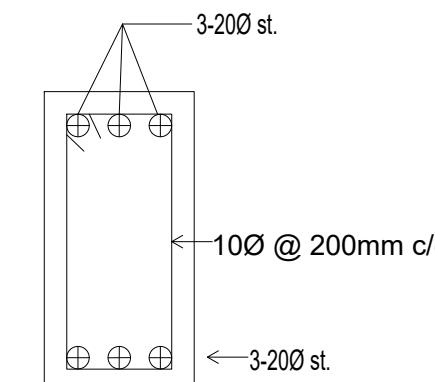


SECTION B-B

(GB9-305mmX508mm)



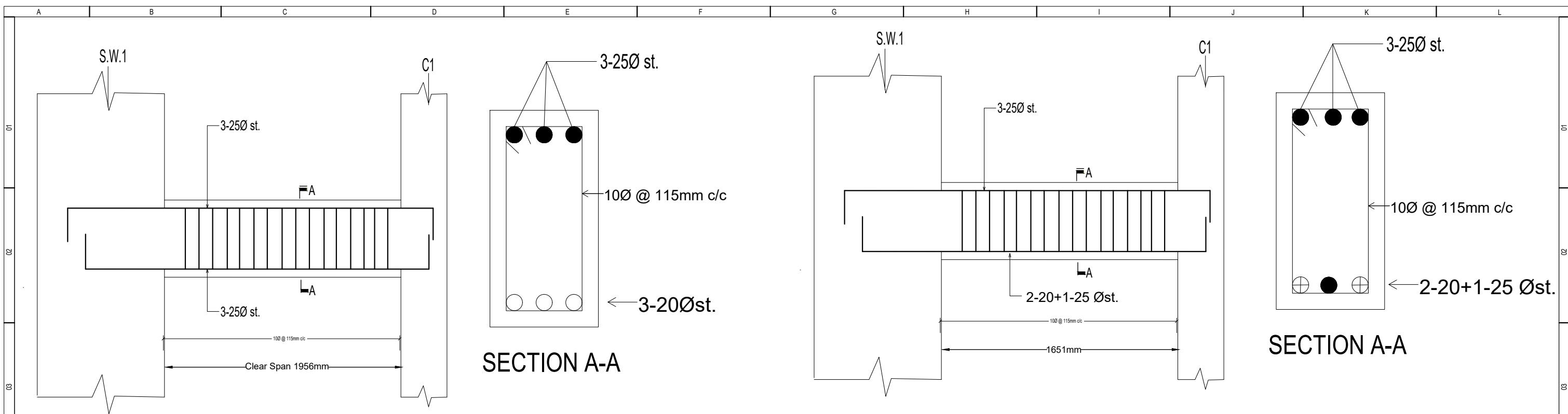
SECTION A-A



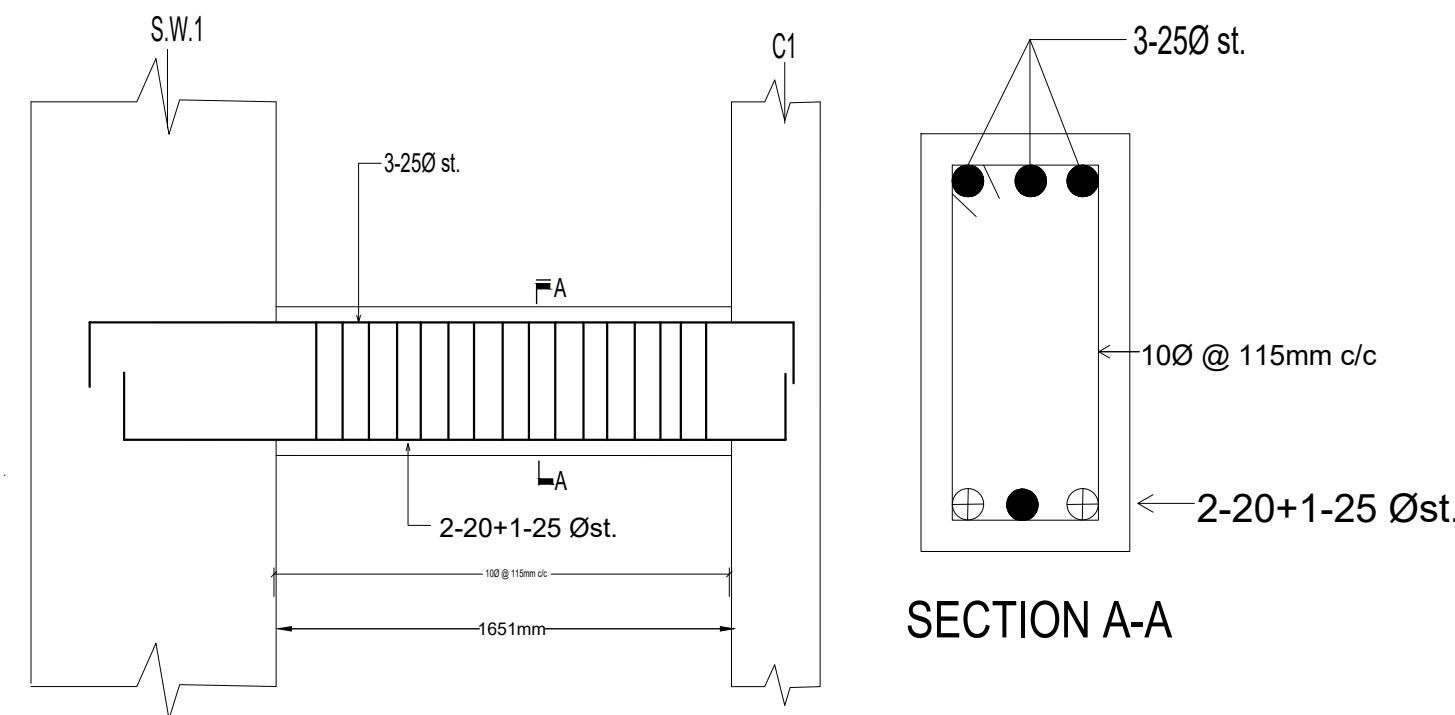
SECTION B-B

(GB10-305mmX508mm)

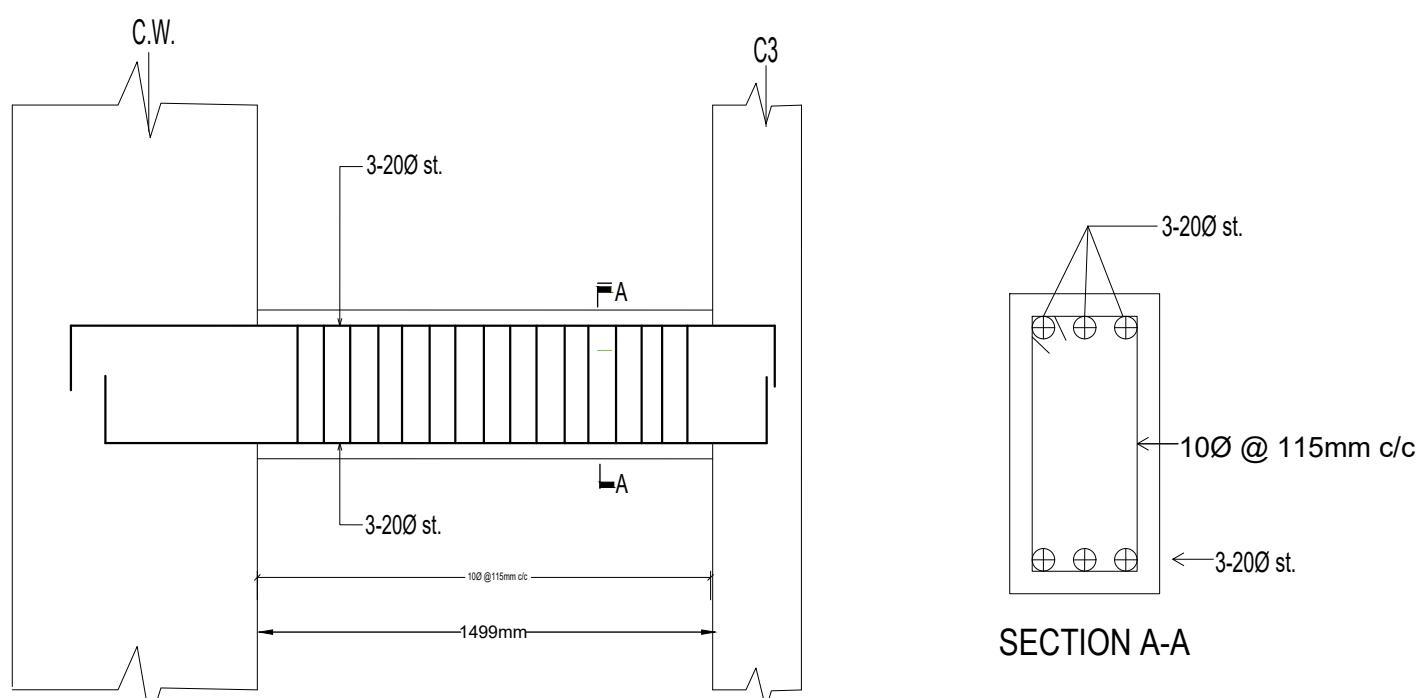
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GB9 & GB10- DETAILING	30	ENGENIUS	BRIDGE BUILDERS				
DRWING TITLE	GRADE BEAM DETAILING					02 20-12-24	01 01-12-24	REV DATE	DESCRIPTION SIGN



(GB11-305mmX508mm)

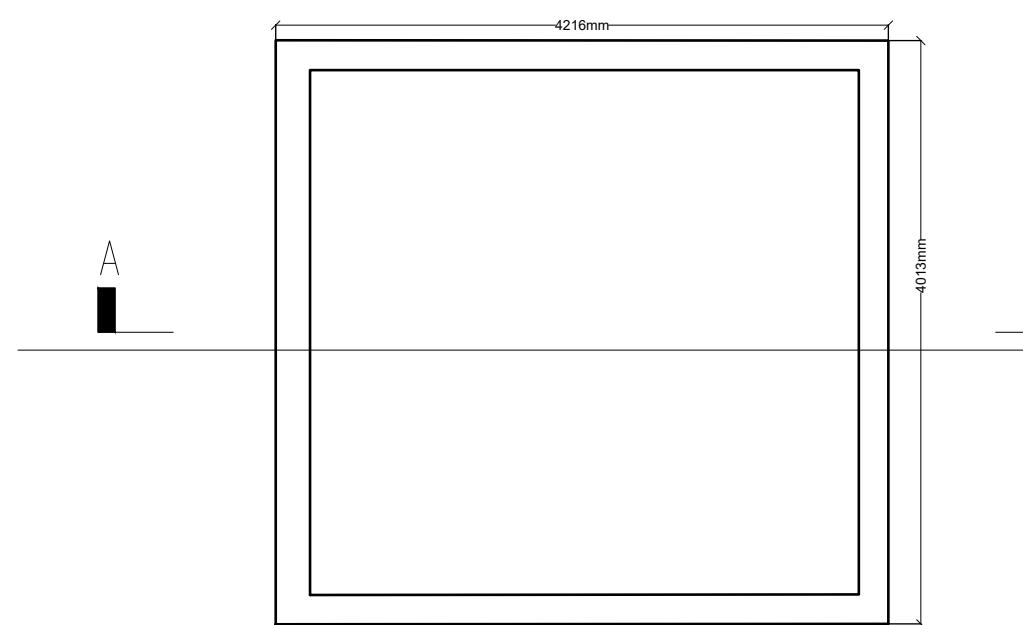


(GB12-305mmX508mm)

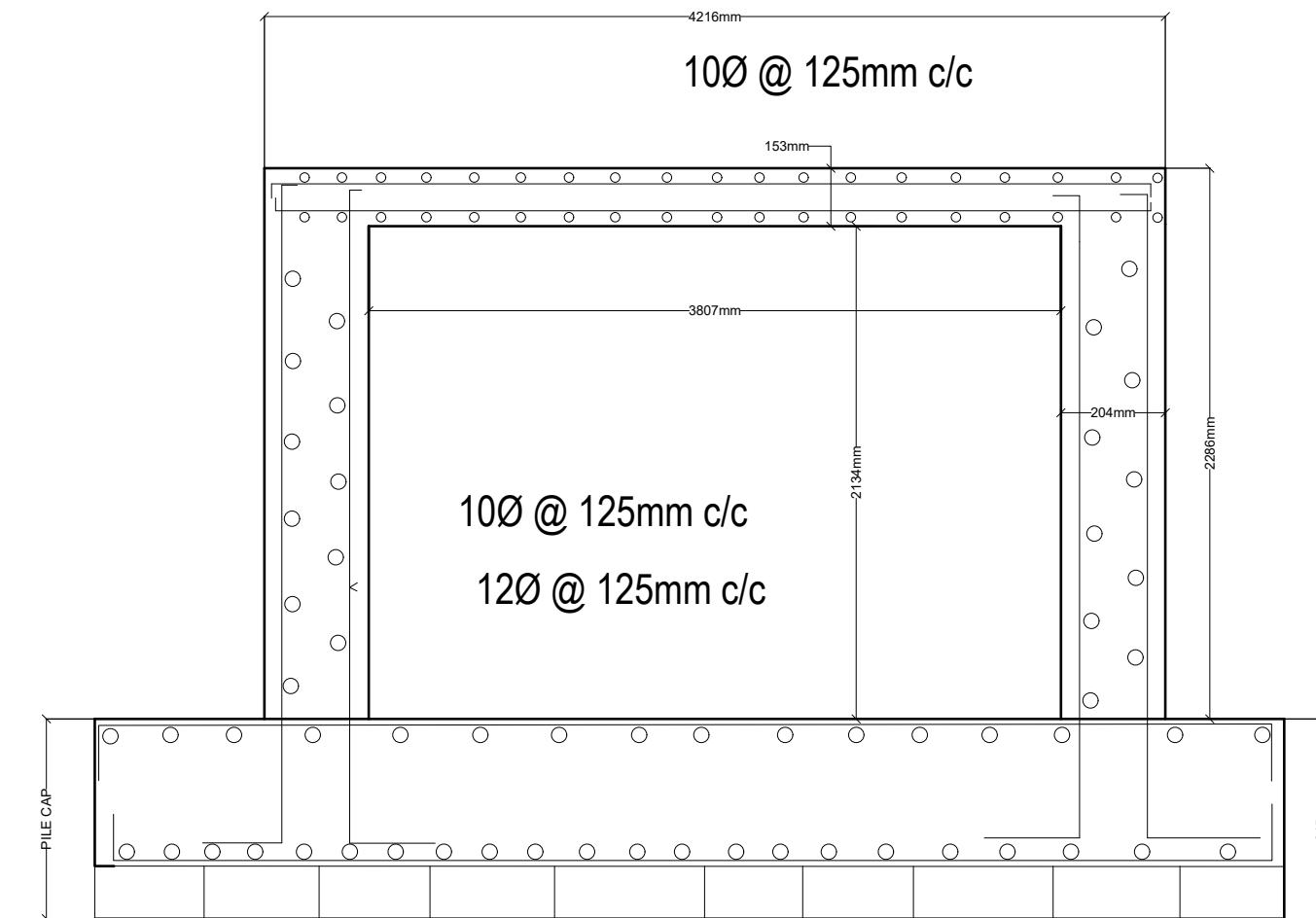


(GB13-305mmX508mm)

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			GB11, GB12 & GB13- DETAILING			ENGENIUS			BRIDGE BUILDERS
DRWING TITLE	GRADE BEAM DETAILING		31				02	20-12-24	
							01	01-12-24	
							REV	DATE	DESCRIPTION
							K	L	SIGN



TOP VIEW



SECTION C-C



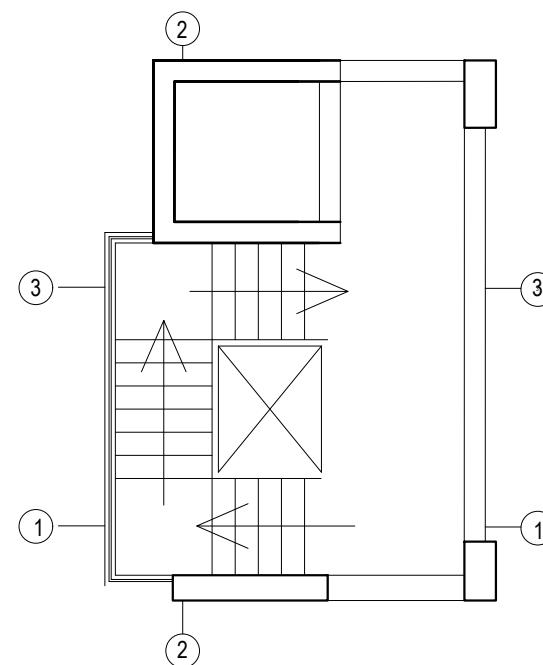
DETAILS OF U.G.W.T WATER TANK

LEGEND:

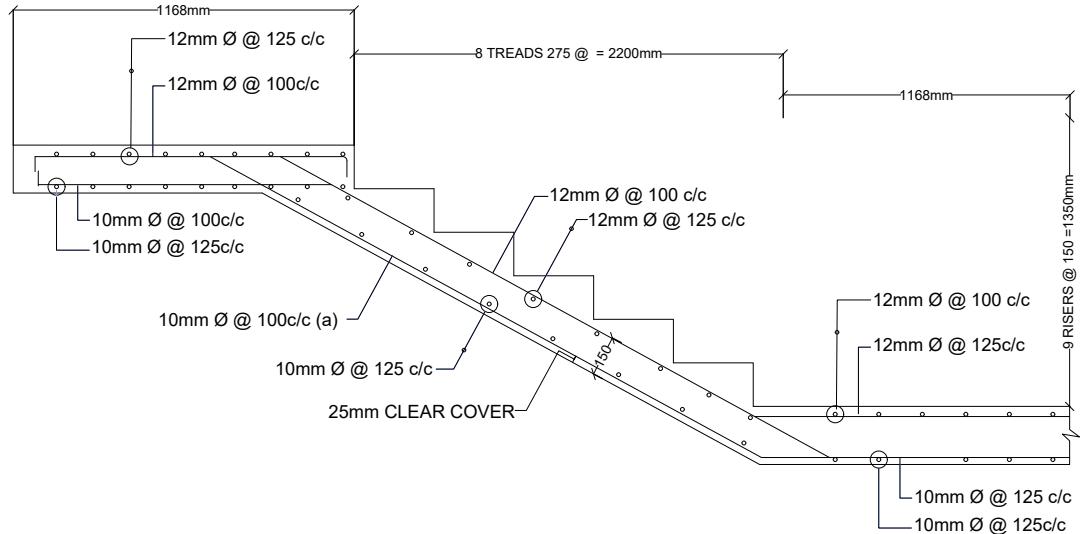
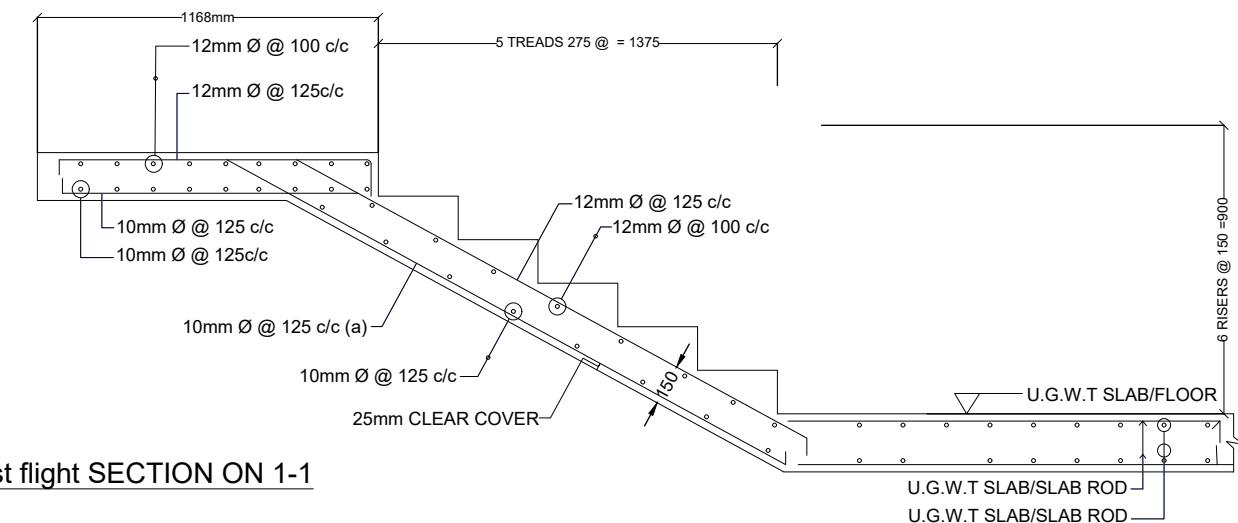
UNDER GROUND WATER TANK WILL BE

CONSTRUCTED ON THE PILE CAP

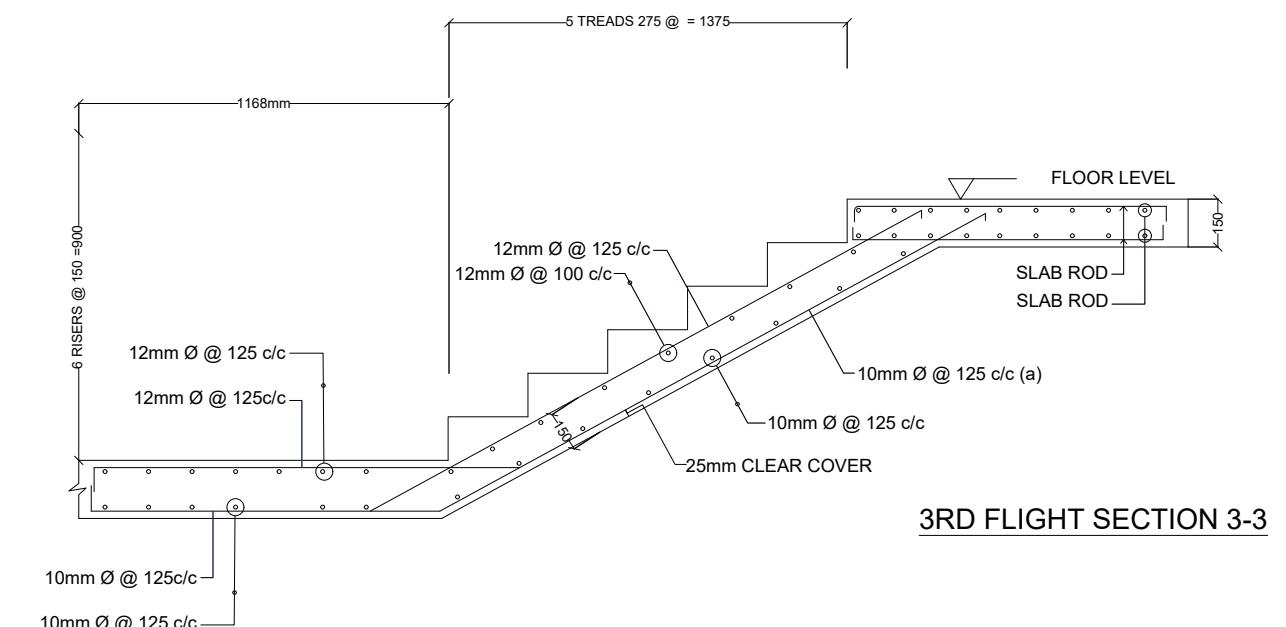
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			UNDERGROUND WATER TANK DETAILING			BRIDGE BUILDERS			
DRWING TITLE	WATER TANK		32		ENGENIUS		02 01	20-12-24 01-12-24	
							REV	DATE	DESCRIPTION



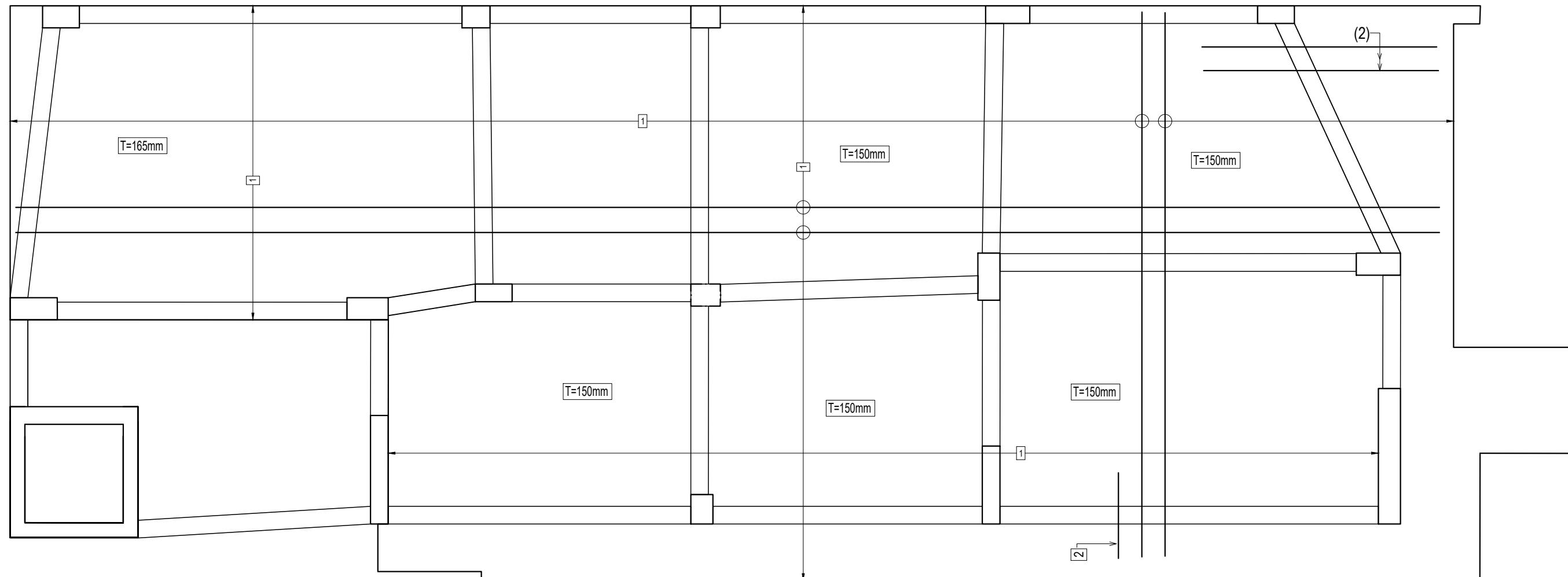
## First flight SECTION ON 1-1



## **SECOND FLIGHT SECTION ON 2-2**



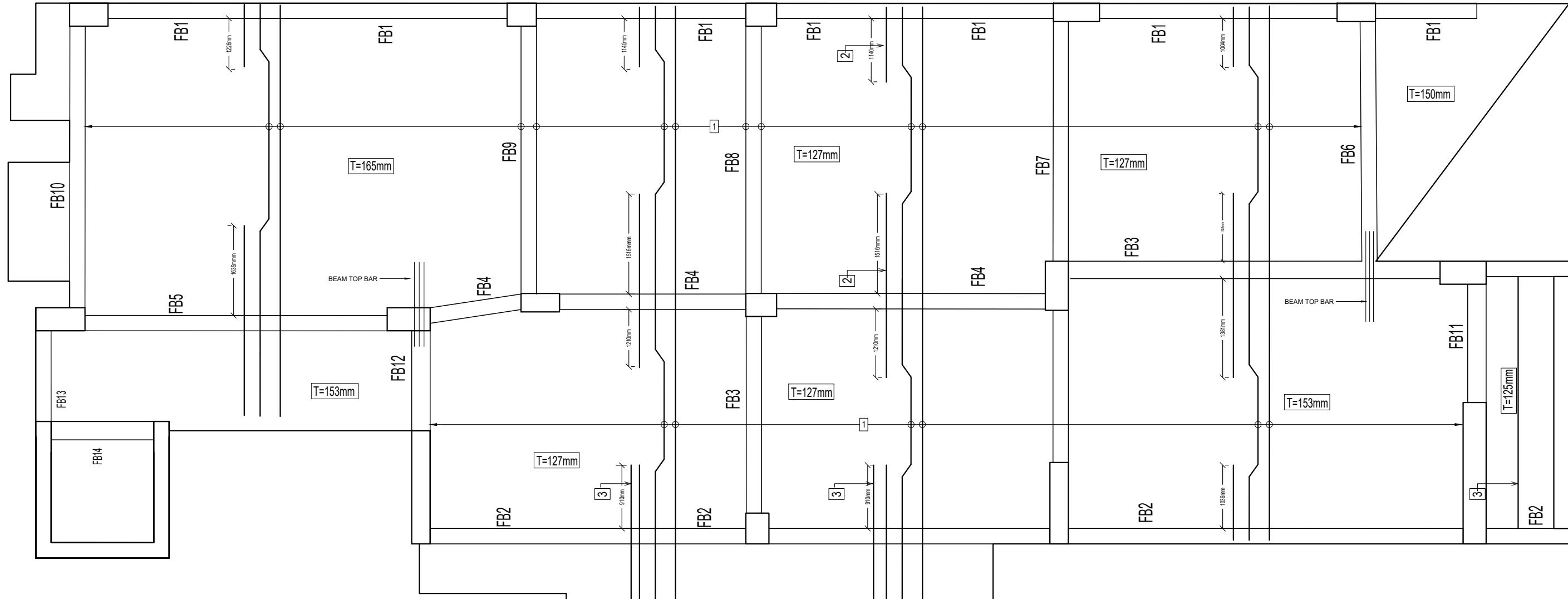
08	PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
	PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		STAIR DETAILING	33		ENGENIUS	BRIDGE BUILDERS			
	DRWING TITLE	STAIR						02	20-12-24	
								01	01-12-24	
								REV	DATE	DESCRIPTION
	A	B	C	D	E	F	G	H	I	J
	K	L	M	N	O	P	Q	R	S	T



LEGEND:

1. 10Ø @ 150mm c/c st. bar
2. 12Ø @ 100mm c/c ext. top bar at cantiliver portion

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		GROUND FLOOR SLAB REINFORCEMENT DETAILS	34		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	SLAB REINFORCEMENT DETAILS						02 20-12-24	01 01-12-24
							REV DATE	DESCRIPTION



### LEGEND:

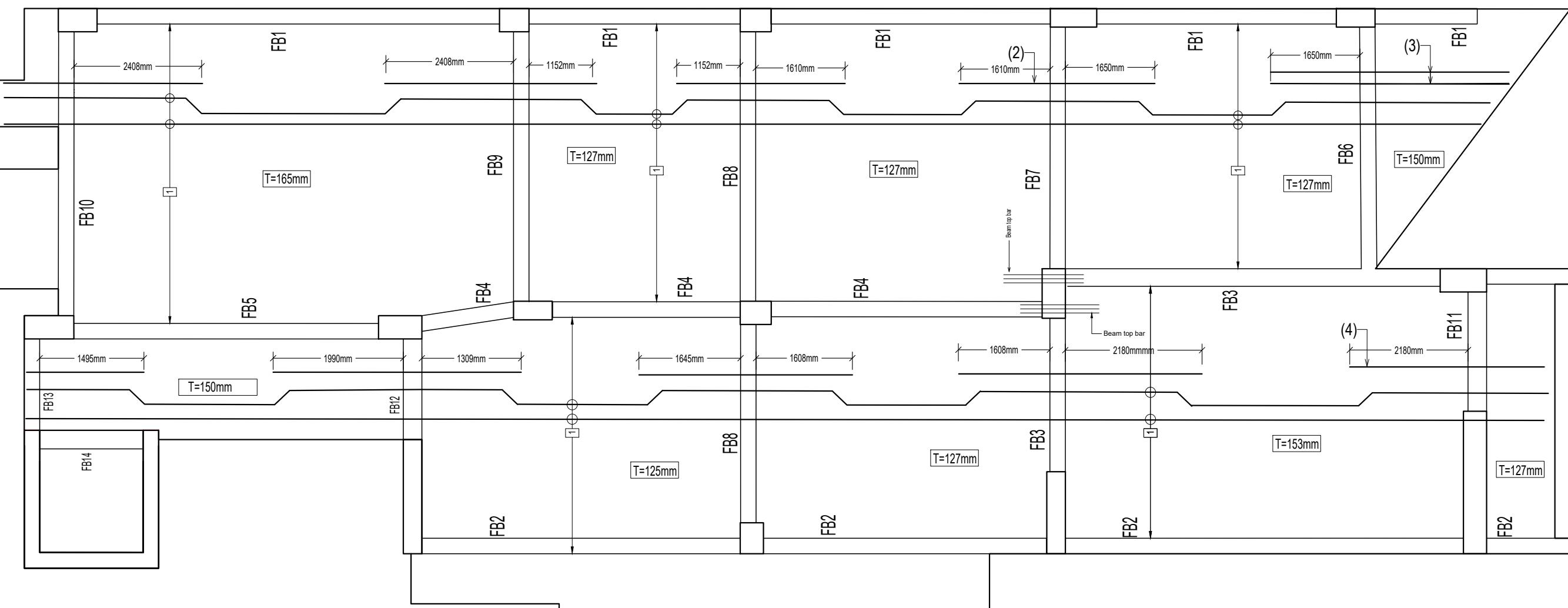
1. 10Ø @ 125mm c/c alt. ckd
2. 1-10Ø ext. top.
3. 1-12Ø ext. c/c top.

### Note:

All unmentioned ext top bars are:

1-10Ø ext. in bet. alt. ckd. &

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING			TYPICAL FLOOR SLAB REINFORCEMENT DETAILS 1	35	ENGENIUS	BRIDGE BUILDERS			
DRWING TITLE	SLAB REINFORCEMENT DETAILS						02 20-12-24	01 01-12-24	REV DATE DESCRIPTION



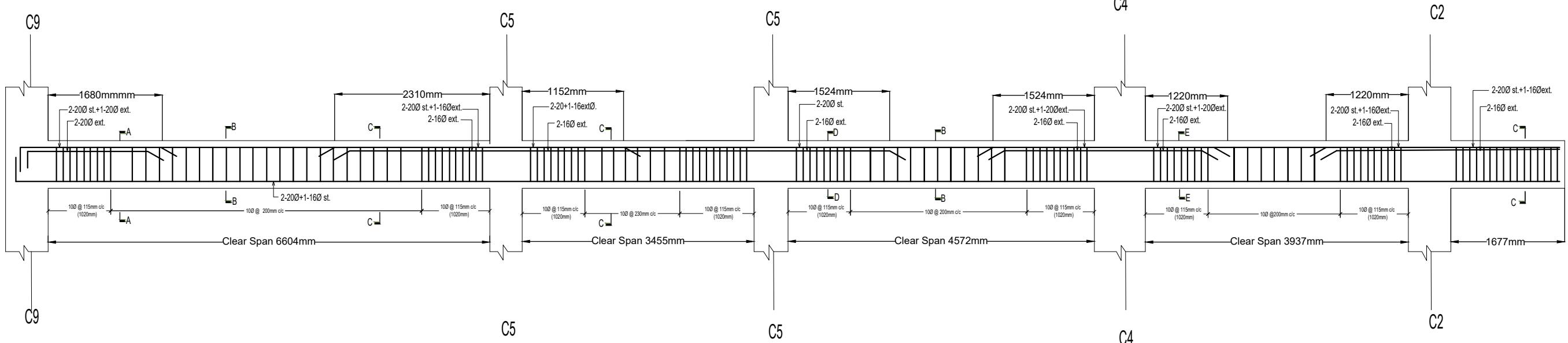
### LEGEND:

1. 10Ø @ 125mm c/c alt. ckd
2. 1-10Ø ext. top.
3. 2-12Ø ext. top.
4. 1-12Ø ext. top.

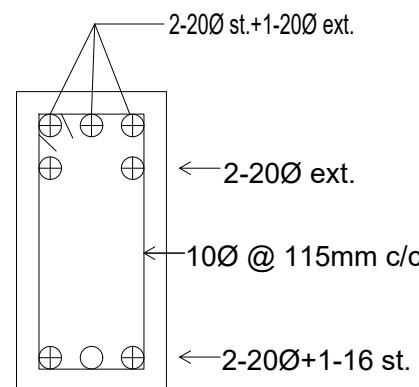
### Note:

All unmentioned ext top bars are:  
1-10Ø ext. in bet. alt. ckd. &

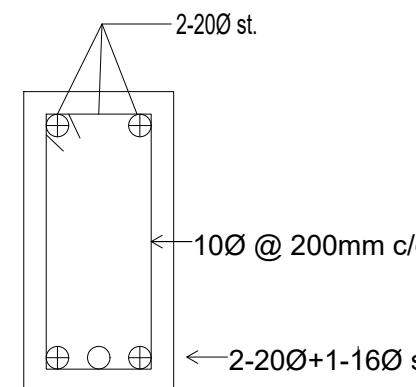
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		TYPICAL FLOOR SLAB REINFORCEMENT DETAILS 2	36		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	SLAB REINFORCEMENT DETAILS						02 20-12-24	01 01-12-24
							REV DATE	DESCRIPTION



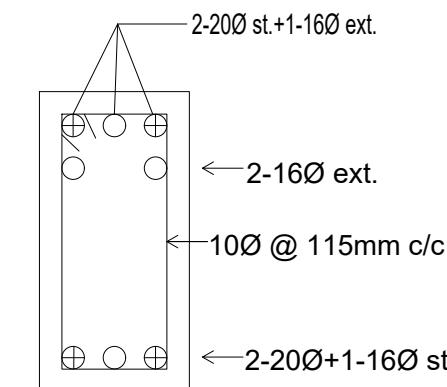
(FB1-254mmX508mm)



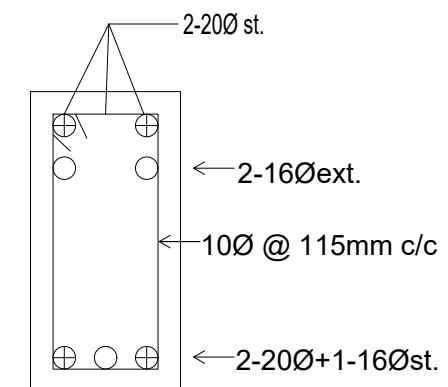
SECTION A-A



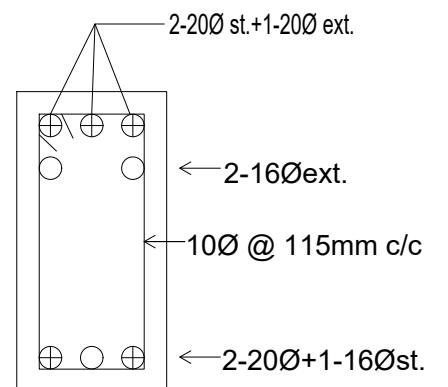
SECTION B-B



SECTION C-C



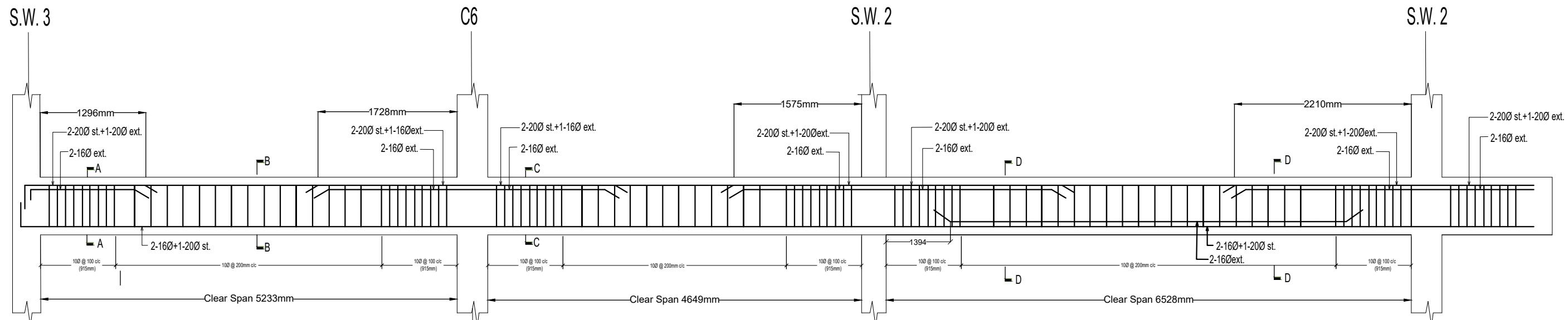
SECTION D-D



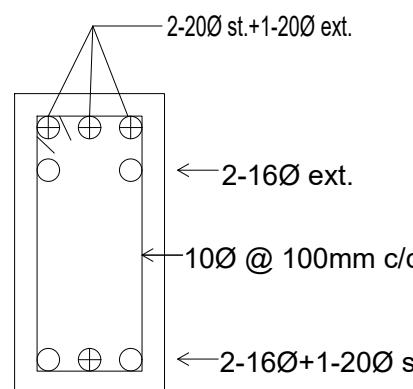
SECTION E-E

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB1-DETAILING	37		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING							
							02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

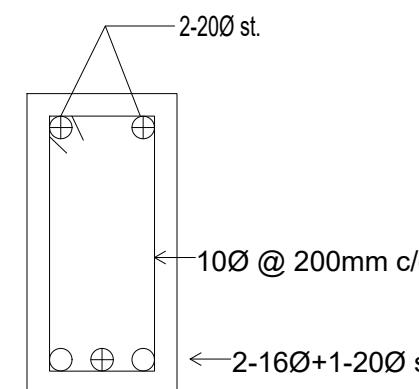
A B C D E F G H I J K L



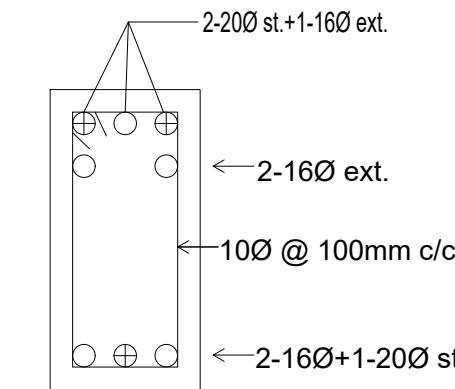
(FB2-254mmX460mm)



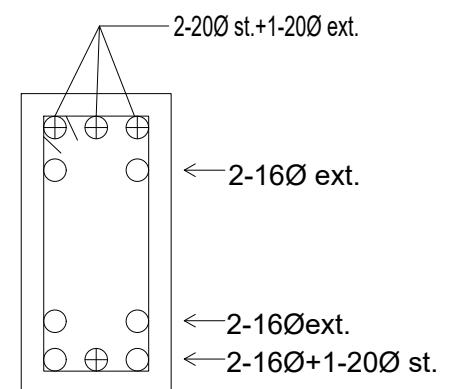
SECTION A-A



## SECTION B-B

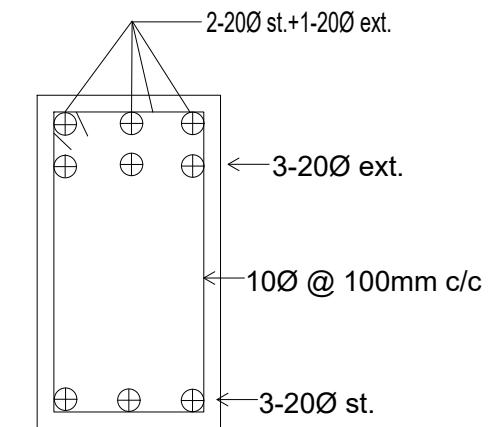
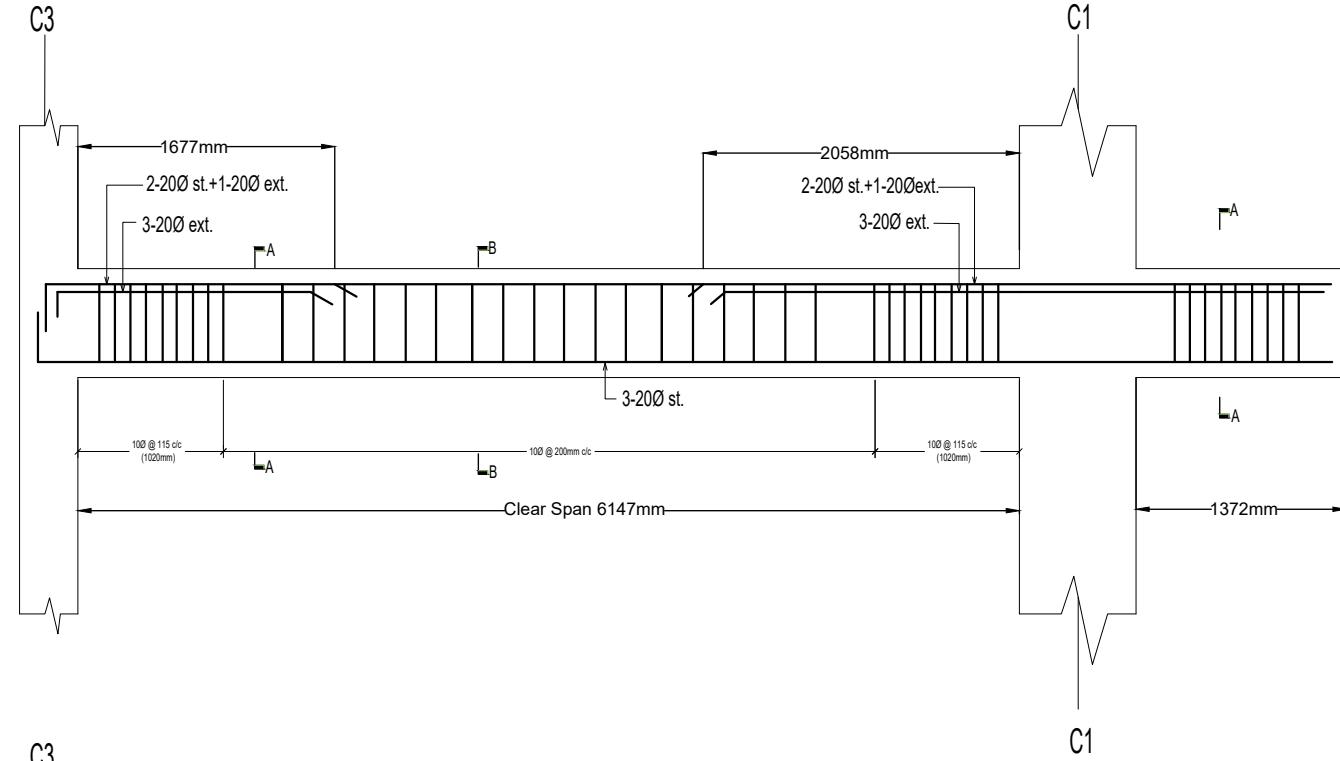


SECTION C-C

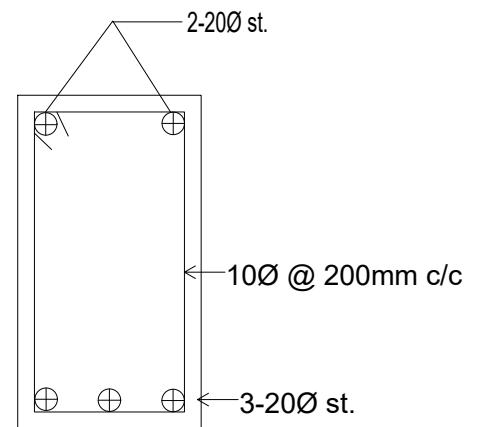


## SECTION D-D

08	PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER								
	PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB2-DETAILING	38		ENGENIUS	BRIDGE BUILDERS								
	DRWING TITLE							02	20-12-24						
	FLOOR BEAM DETAILING							01	01-12-24						
								REV	DATE	DESCRIPTION					
	A	B	C	D	E	F	G	H	I	J					
	K	L	M	N	O	P	Q	R	S	T					



SECTION A-A



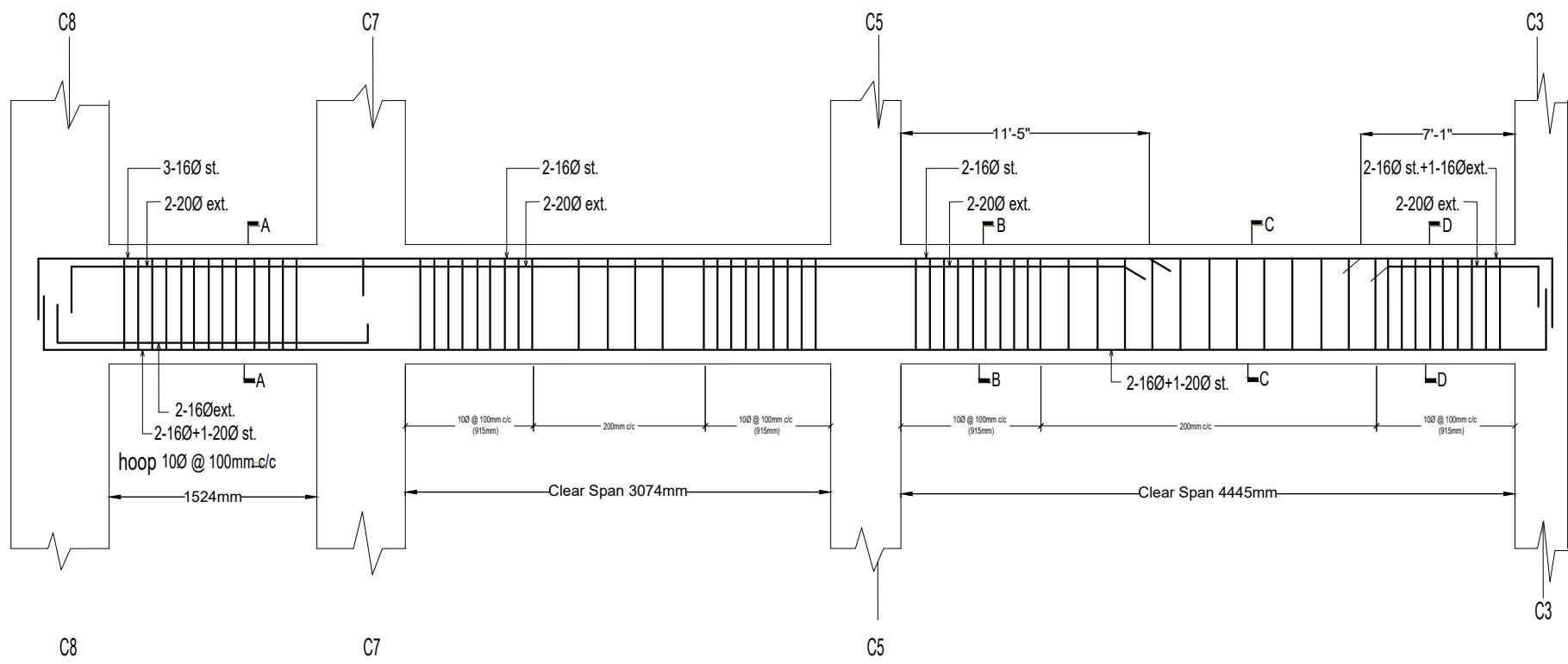
SECTION B-B

(FB3-305mmX508mm)

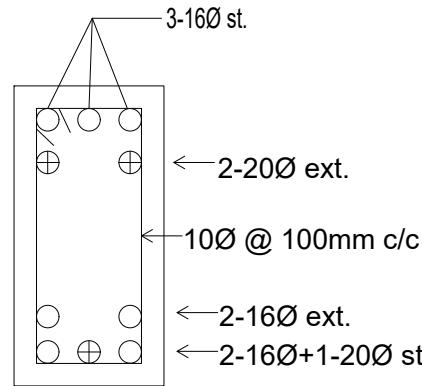
C3

C1

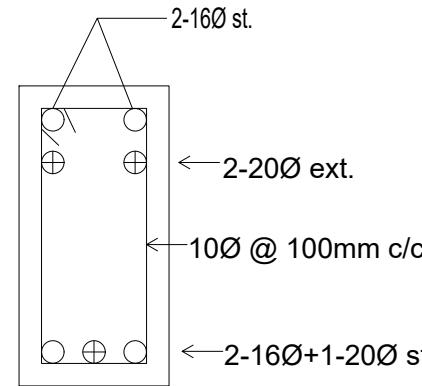
PROJECT - ENGENIUS		SHEET TITLLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB3-DETAILING	39		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



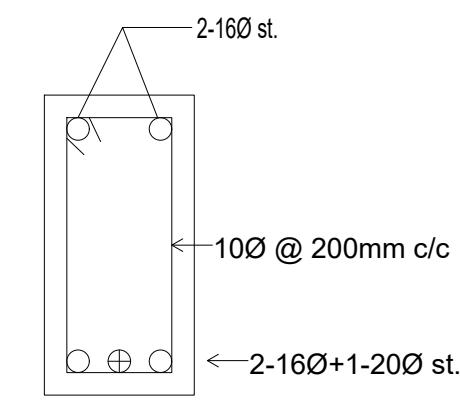
(FB4-254mmX460mm)



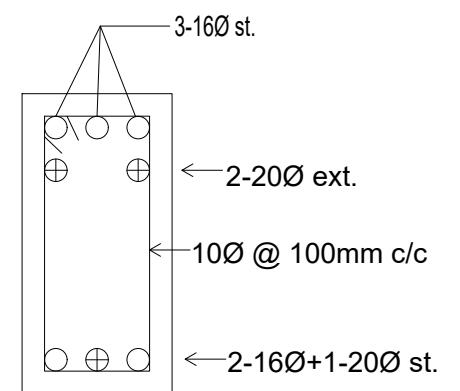
SECTION A-A



SECTION B-B

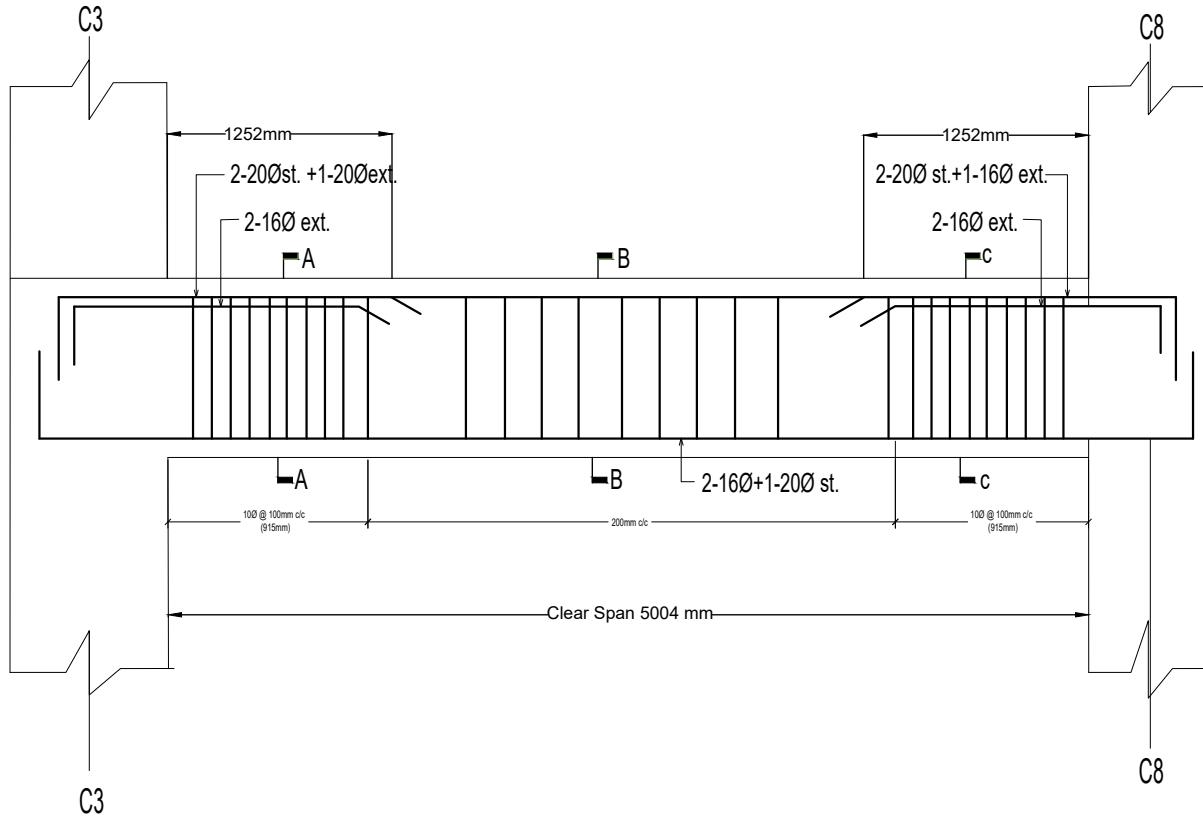


SECTION C-C

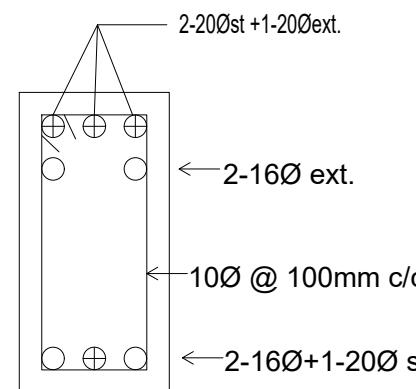


SECTION D-D

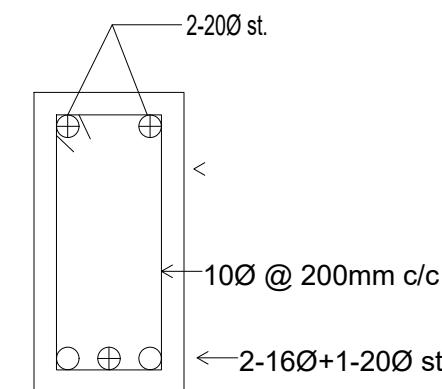
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB4-DETAILING	40		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING							
							02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



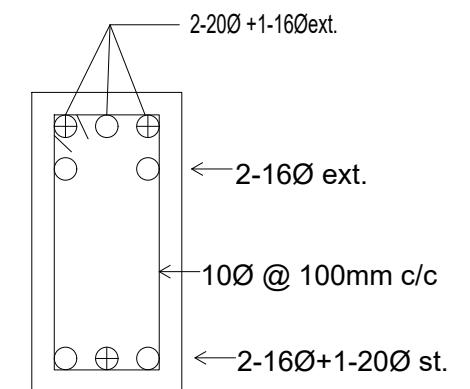
(FB5-254mmX460mm)



SECTION A-A

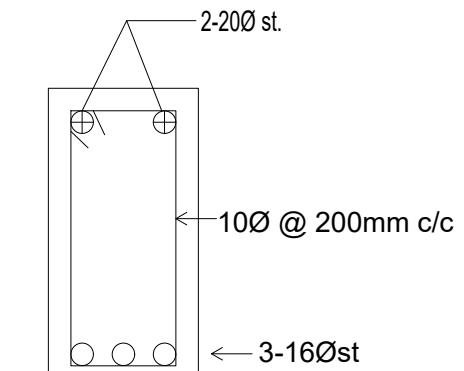
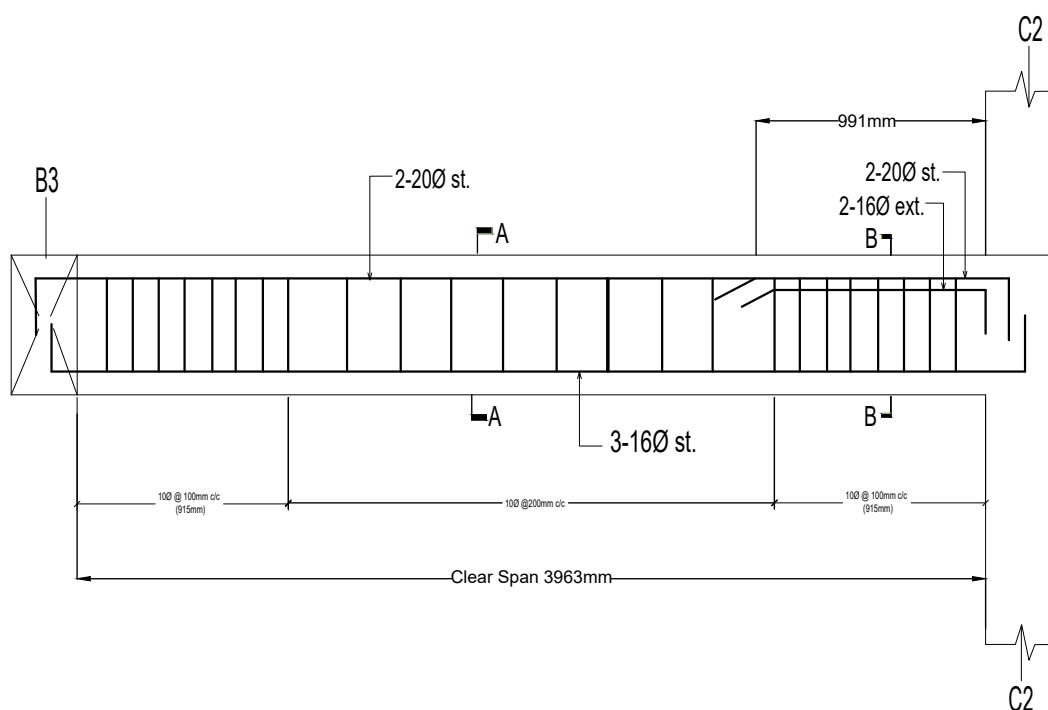


SECTION B-B

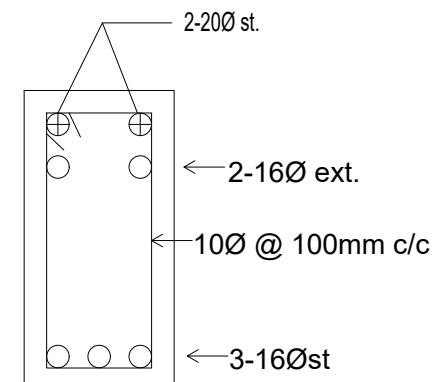


SECTION C-C

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB5-DETAILING	41		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

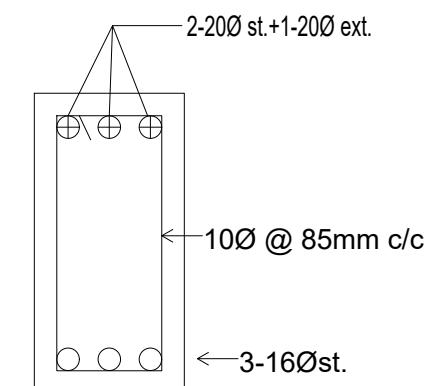
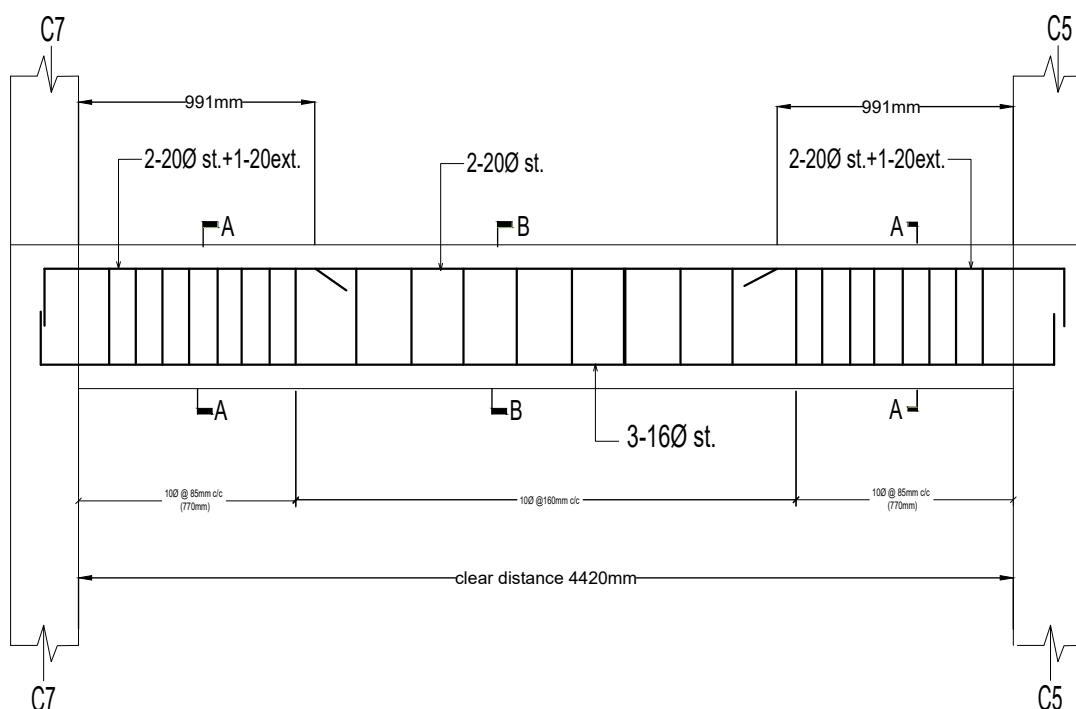


SECTION A-A

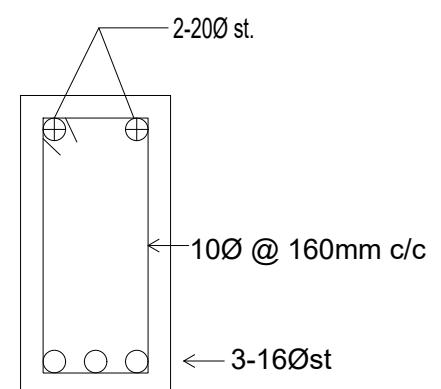


SECTION B-B

(FB6-254mmX460mm)



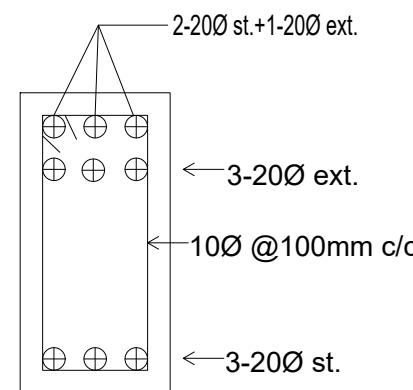
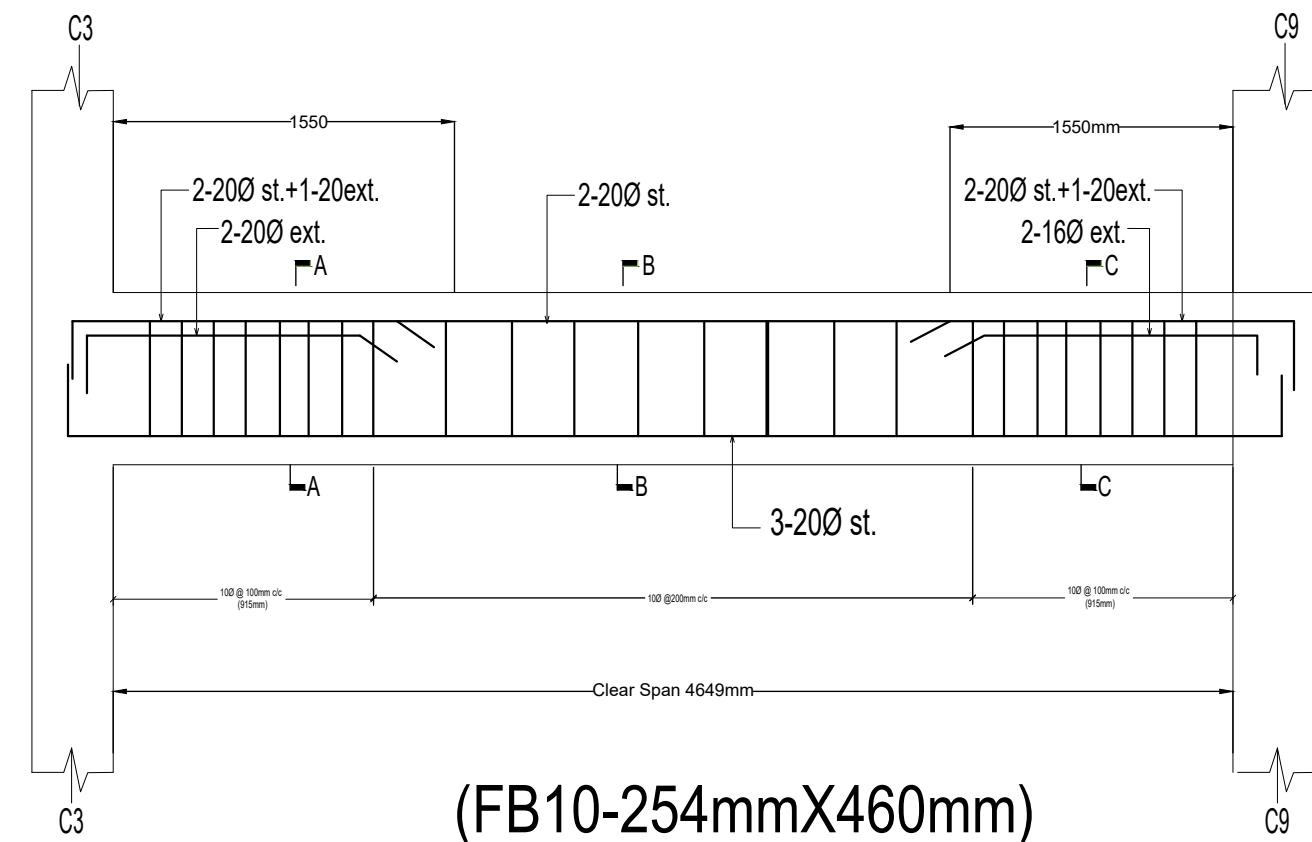
SECTION A-A



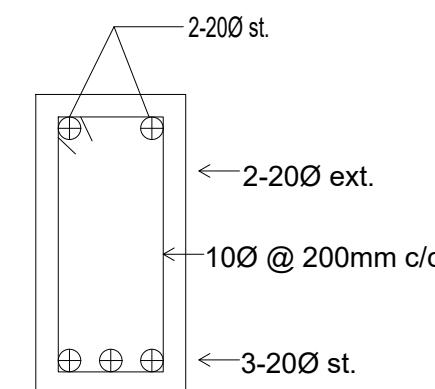
SECTION B-B

(FB9-254mmX381mm)

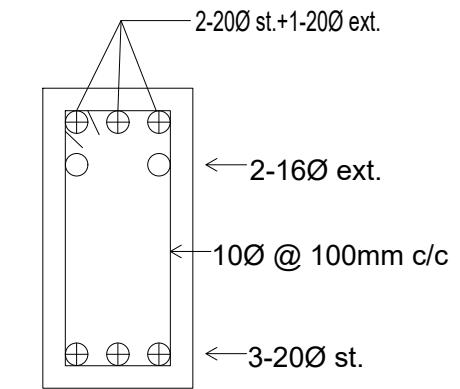
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB6 & FB9-DETAILING	42		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



SECTION A-A



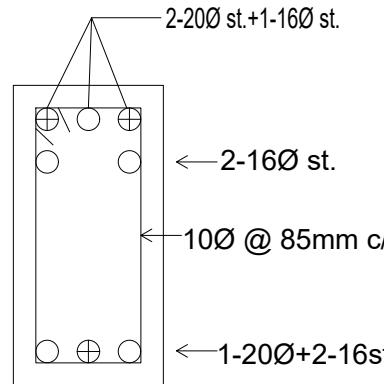
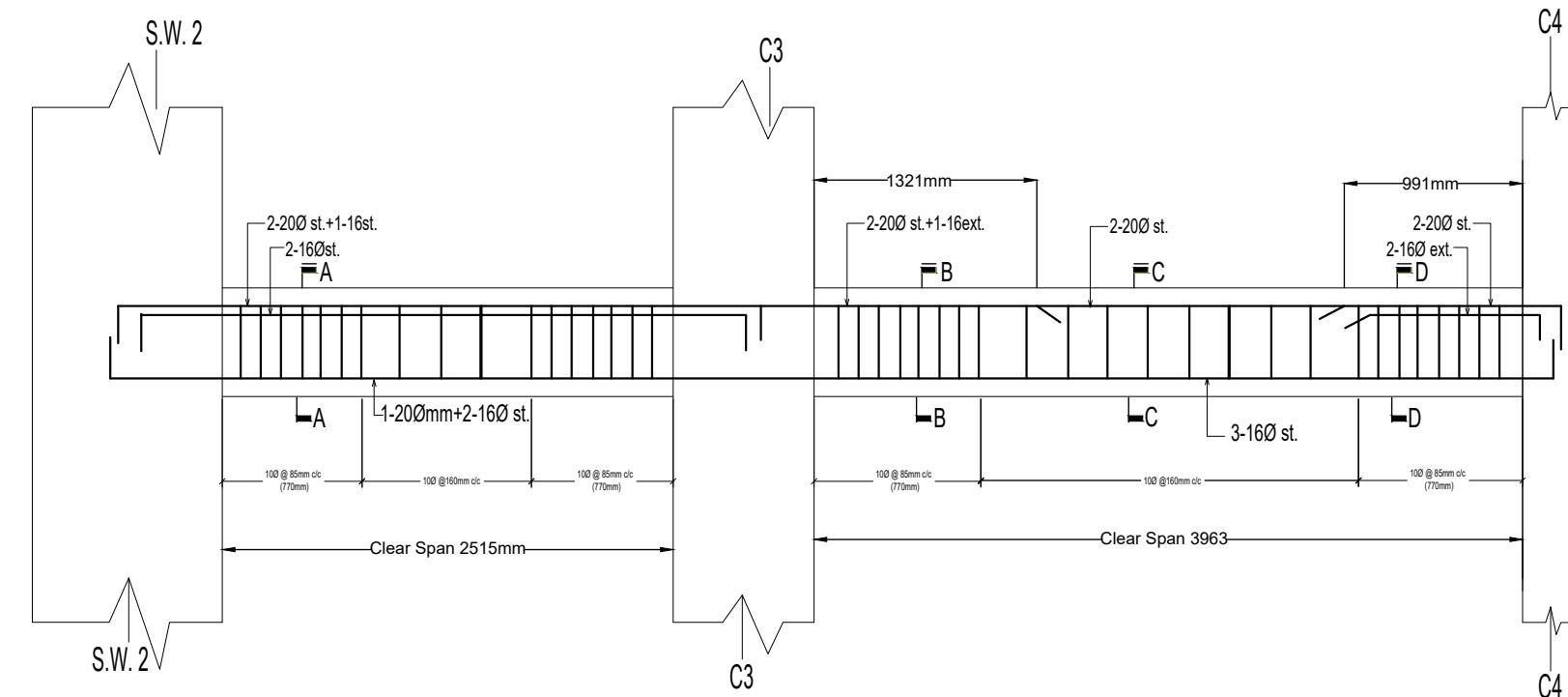
SECTION B-B



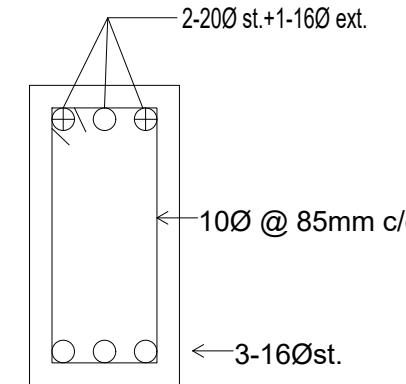
SECTION C-C

(FB10-254mmX460mm)

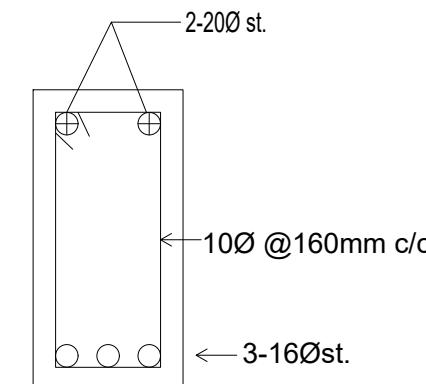
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB10-DETAILING	43		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



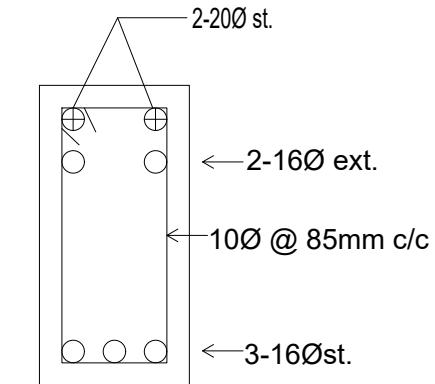
SECTION A-A



## SECTION B-I



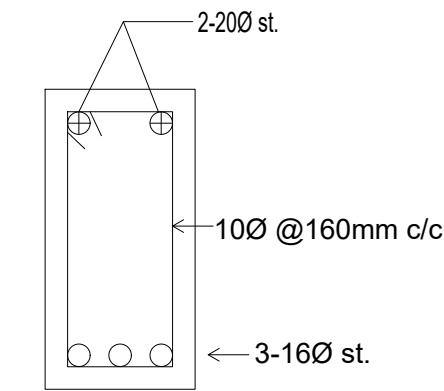
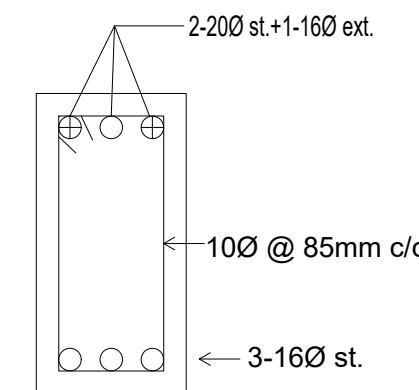
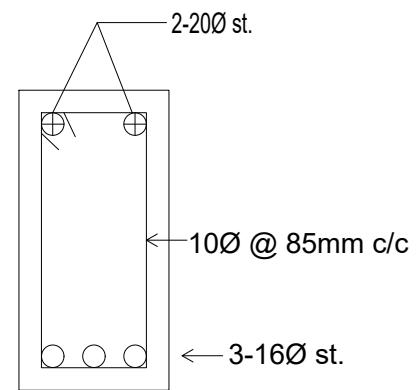
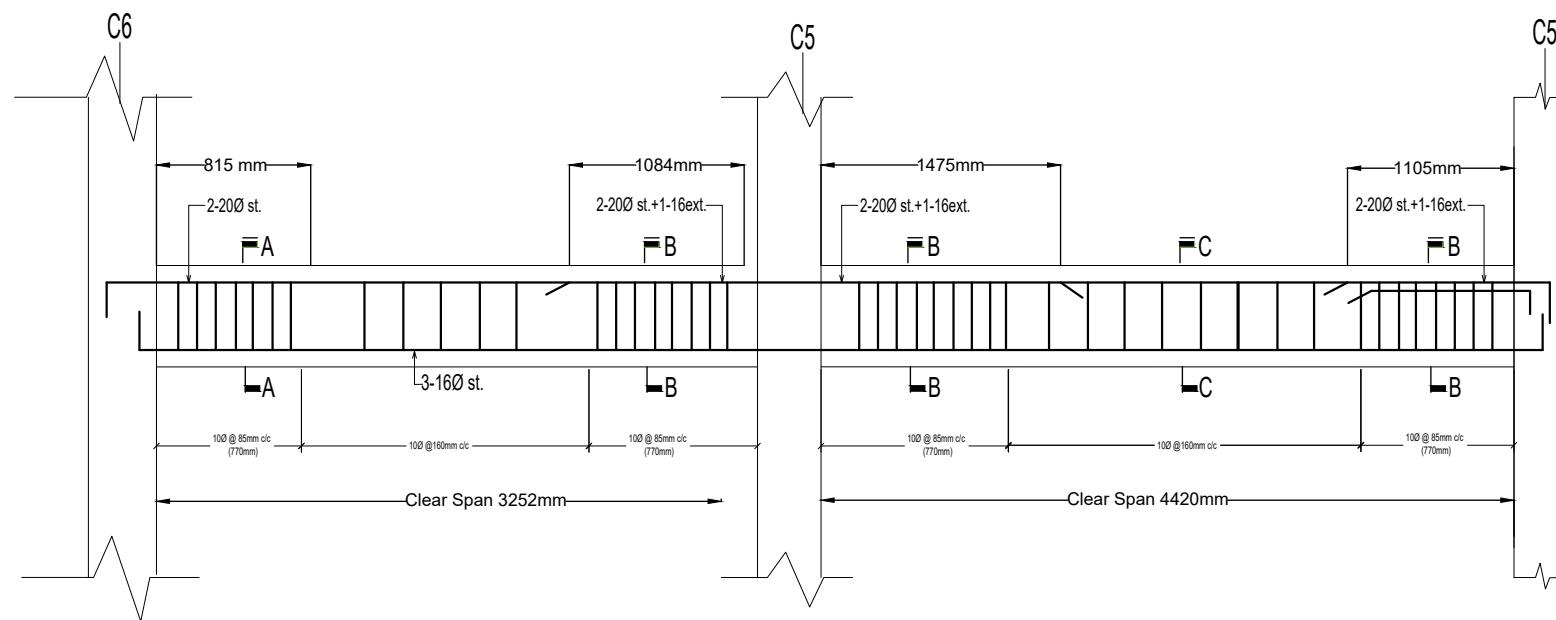
## SECTION C-C



## SECTION D-D

(FB7-254mmX381mm)

08	PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER								
	PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB7-DETAILING	44		ENGENIUS	BRIDGE BUILDERS								
	DRWING TITLE							02	20-12-24						
	FLOOR BEAM DETAILING							01	01-12-24						
	REV	DATE	DESCRIPTION												
	A	B	C	D	E	F	G	H	I	J	K	L			



(FB8-254mmX381mm)

PROJECT-ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB8-DETAILING	45		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	

A B C D E F G H I J K L

01  
02  
03  
04  
05  
06  
07  
08

S.W.1 C1

(FB11-305mmX610mm)  
(1st to 4th floor)

SECTION A-A

3-25Ø st.  
3-25Ø st.  
2-16Ø st.

3-25Ø st.  
3-25Ø st.

100 @ 85mm c/c

Clear Span 1956mm

SECTION A-A

3-25Ø st.  
3-25Ø st.  
2-16Ø st.

3-25Ø st.  
3-25Ø st.

100 @ 85mm c/c

Clear Span 1956mm

SECTION A-A

3-25Ø st.  
3-25Ø st.

2-25Ø st.  
3-25Ø st.

PROJECT - ENGENIUS

PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING

DRWING TITLE FLOOR BEAM DETAILING

SHEET TITTLE FB11-DETAILED

SHEET NUMBER 46

CLIENT

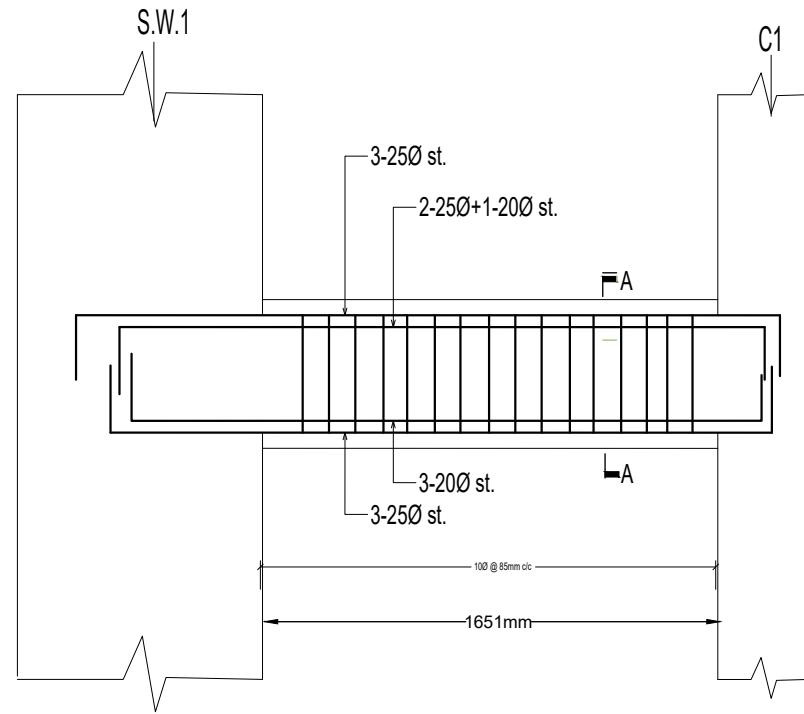
ARCHITECT FARM ENGENIUS

STRUCTURAL ENGINEER BRIDGE BUILDERS

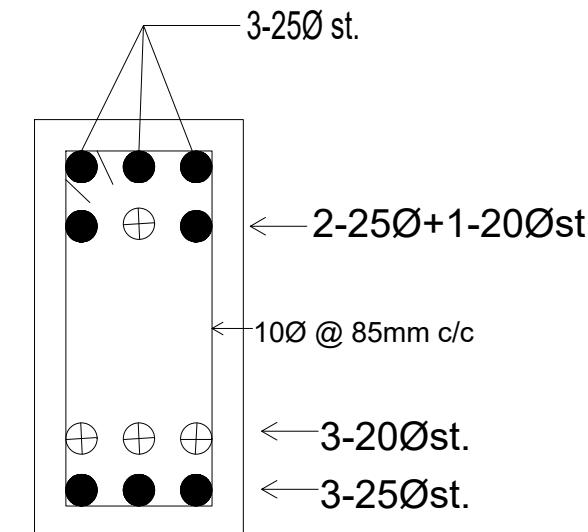
02 20-12-24  
01 01-12-24

REV DATE DESCRIPTION

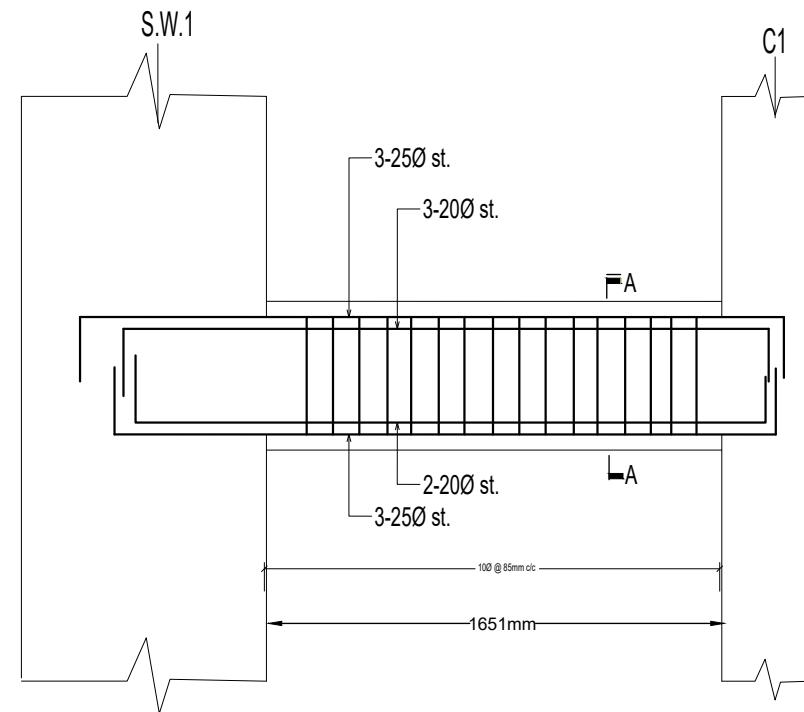
A B C D E F G H I J K L



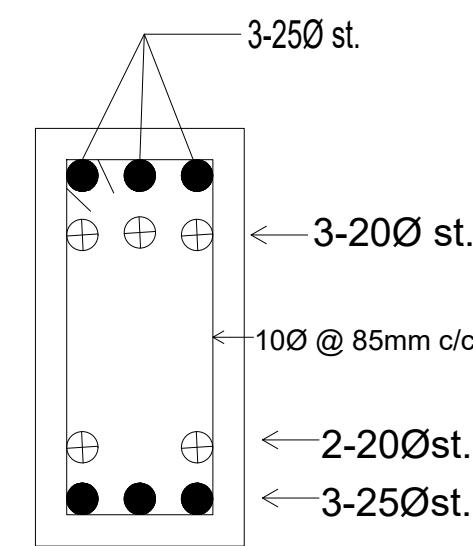
(FB12-305mmX610mm)  
(1st to 4th floor)



SECTION A-A

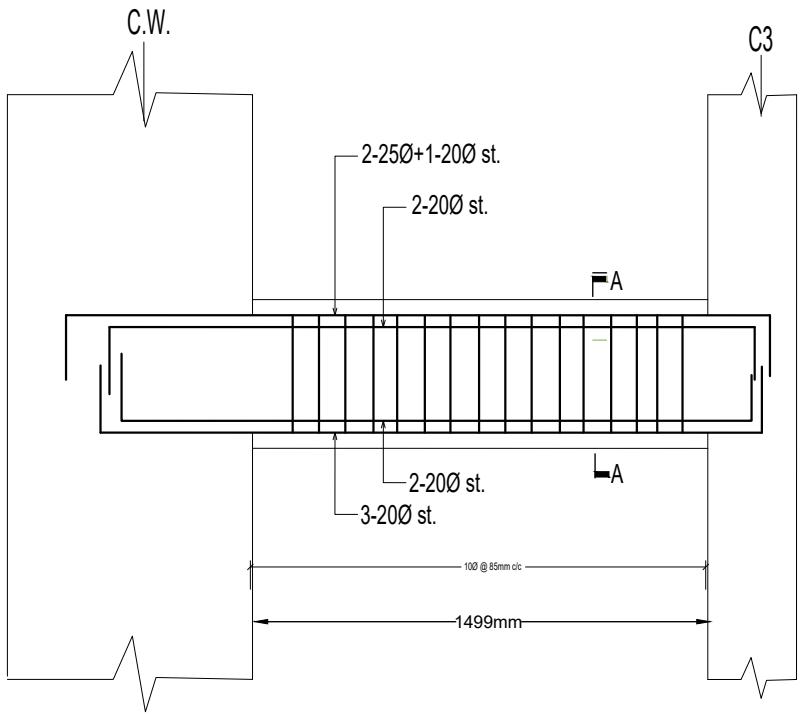


(FB12-305mmX610mm)  
(5th floor to roof)

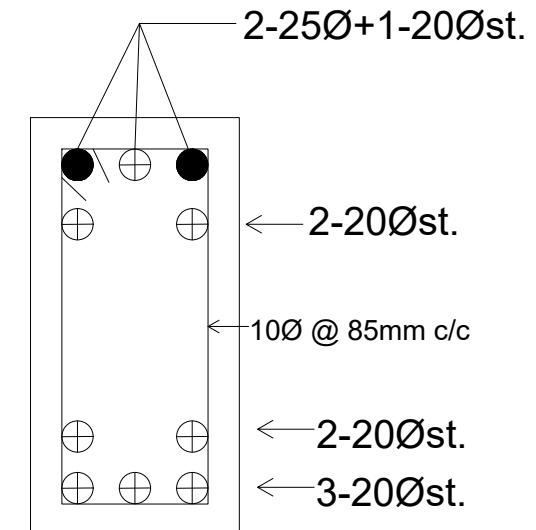


SECTION A-A

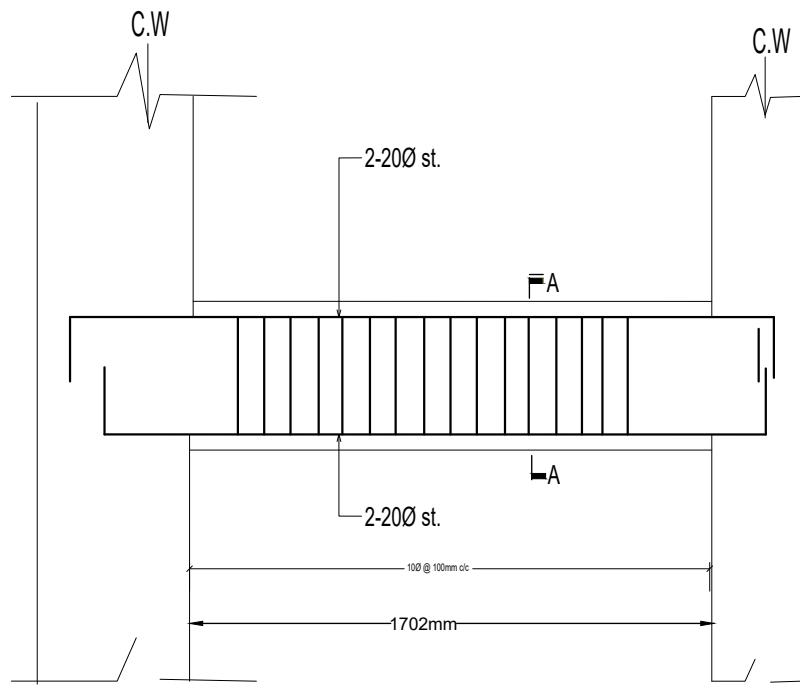
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB12-DETAILING	47		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING							
							02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION



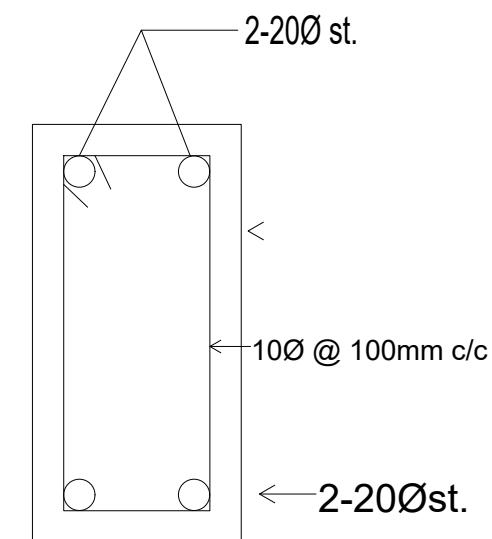
(FB13-254mmX460mm)



SECTION A-A



(FB14-254X460mm)



SECTION A-A

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		FB 13 & FB 14-DETAILED	48		ENGENIUS	BRIDGE BUILDERS		
DRWING TITLE	FLOOR BEAM DETAILING						02 20-12-24	
							01 01-12-24	
							REV DATE	DESCRIPTION

A B C D E F G H I J K L

01  
02  
03  
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05  
06  
07  
08

**Left machine room**

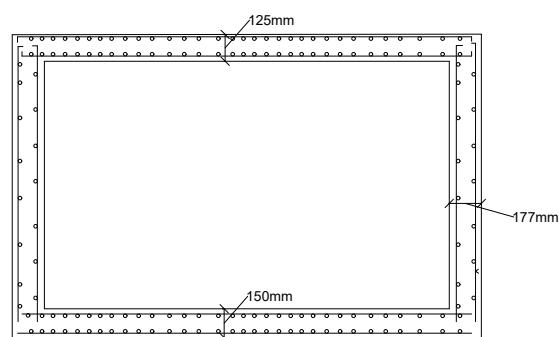
**Lift machine room**

**Bottom slab**

LEGEND: bottom slab

1. 12Ø @ 100mm c/c
2. 10Ø @ 150mm c/c

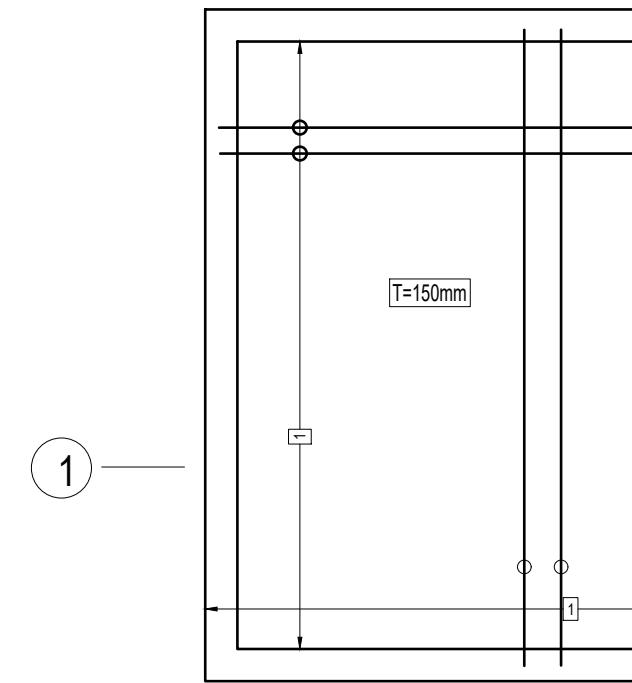
PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER		
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		LIFT ROOM , BOTTOM SLAB & TOP SLAB DETAILING	49		ENGENIUS	BRIDGE BUILDERS		
DRAWING TITLE	LIFT ROOM							
02	20-12-24							
01	01-12-24							
REV	DATE	DESCRIPTION						



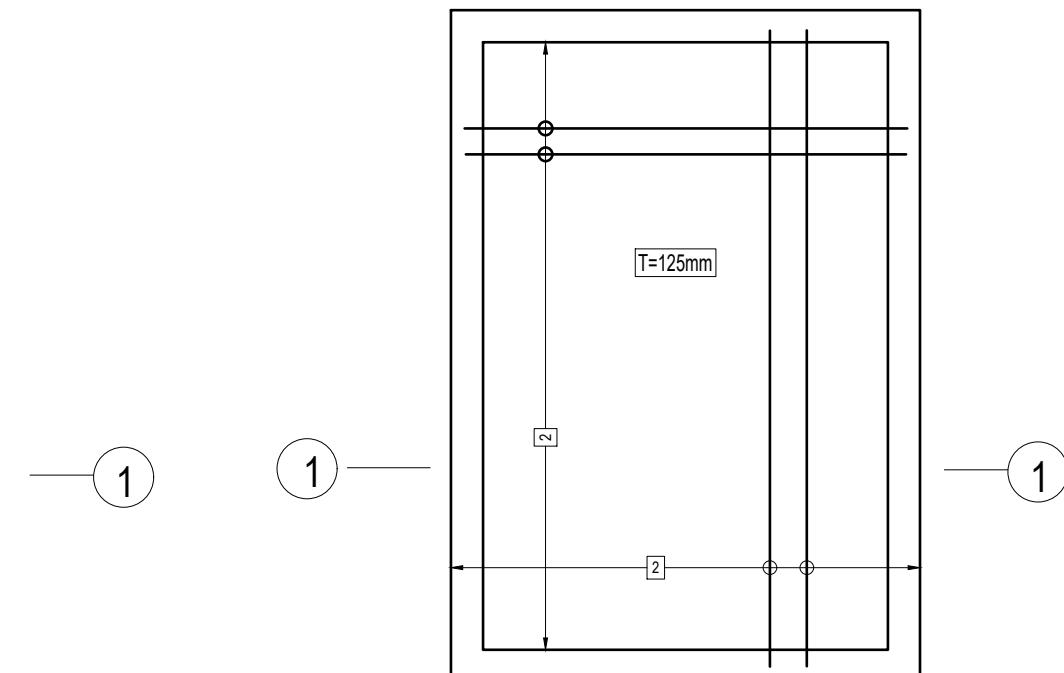
section 1-1

10Ø @ 150mm c/c  
10Ø @ 100mm c/c

12Ø @ 125mm c/c



Bottom slab



top slab

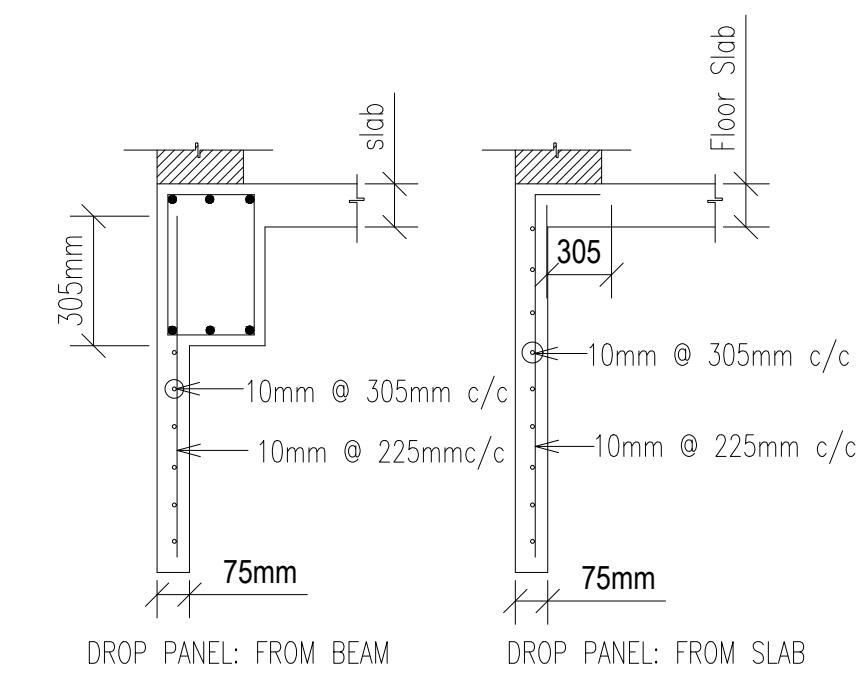
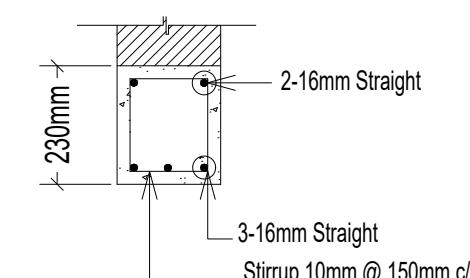
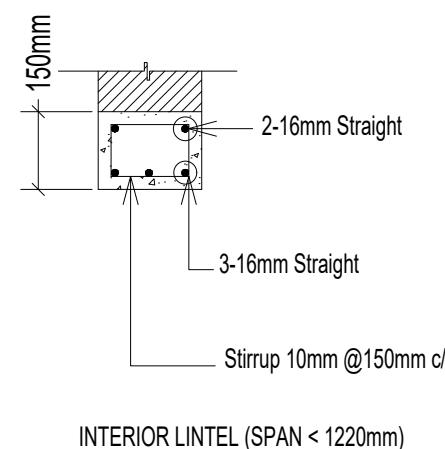
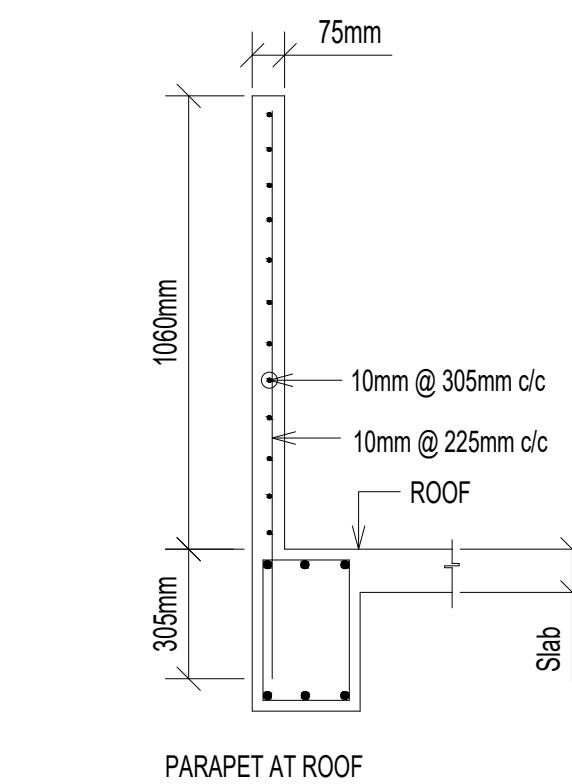
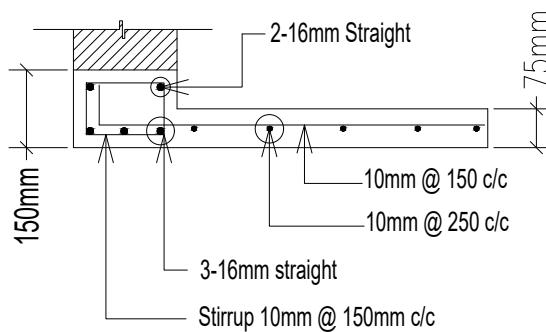
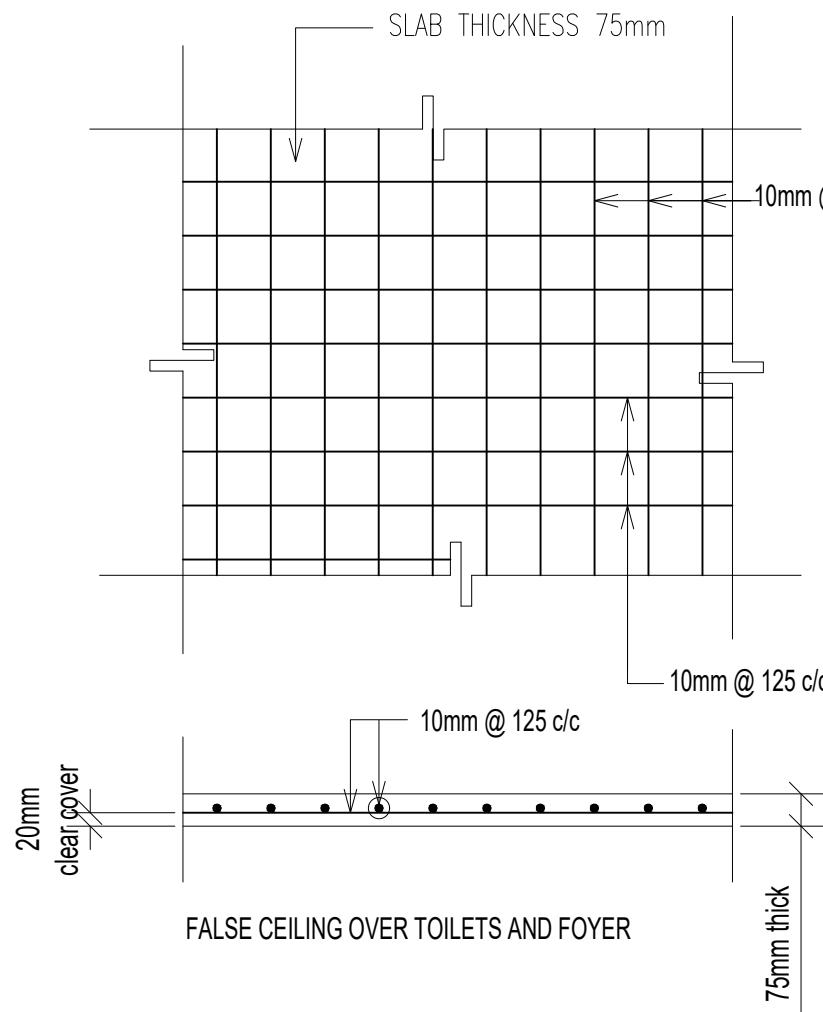
- LEGEND:
1. 12Ø @ 100mm c/c
  2. 10Ø @ 150mm c/c

OVERHEAD WATER TANK

PROJECT - ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER			
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		OVER HEAD WATER TANK DESIGN	50		ENGENIUS	BRIDGE BUILDERS			
DRWING TITLE	OVER HEAD WATER TANK DESIGN						02	20-12-24	
							01	01-12-24	
							REV	DATE	DESCRIPTION

## MISCELLANEOUS STRUCTURAL DETAILS

The miscellaneous details shown below shall be followed wherever applicable unless otherwise mentioned elsewhere.



PROJECT-ENGENIUS		SHEET TITLE	SHEET NUMBER	CLIENT	ARCHITECT FARM	STRUCTURAL ENGINEER					
PROPOSED G+07 (EIGHT) STORIED RESIDENTIAL BUILDING		MISCELLANEOUS DETAILING	51		ENGENIUS	BRIDGE BUILDERS					
DRAWING TITLE	MISCELLANEOUS DETAILING						REV	DATE	DESCRIPTION		
A	B	C	D	E	F	G	H	I	J	K	L